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Overcome Big Data Challenges

Supermicro Offers The Fastest, Most Power-Efficient & Highly Reliable Solutions Optimized For Hadoop

SUPERMICRO®

As the sophistication of applications and new technologies continues to grow, companies are left with extremely large amounts of information to store. This influx of data has spurred the creation of Hadoop, a software framework designed to make Big Data much more manageable.

Since Hadoop's entrance into the marketplace, both open-source and commercial solutions have become increasingly popular. In fact, according to a recent study, 25% of businesses with 1,000 or more employees and at least 100 servers have implemented Hadoop, 20% are in the process of deploying it, and more than 30% are evaluating it.

Hadoop is a popular and powerful framework, but it can only be truly successful if it has the hardware to back it up, which is where Supermicro comes in. With the company's nearly 20 years of experience and extensive catalog of storage servers, Supermicro found the best possible pieces of equipment to support Hadoop so its customers wouldn't have to. From complete racks to individual components and nodes, Supermicro has everything you need to start using Hadoop or help make your existing implementation that much better.

42U Turnkey Cluster Racks

Nearly all companies need to contend with Big Data challenges, which is why Supermicro offers 42U Hadoop rack solutions that provide the scalability to fit the needs of almost any business.

"Our 42U Hadoop rack solutions can support nearly 2PB of data storage while consuming minimal power, making them the best choice for data center and enterprise Big Data applications," says Charles Liang, President and CEO of Supermicro. All of Supermicro's Hadoop solutions are designed to work perfectly with the Hadoop Distributed File System (HDFS) and parallel processing MapReduce features, which are essential for better overall Big Data management.

These rack solutions support the Intel® Xeon® Processor E5-2600 product family and sport 94% Platinum-level power supplies, so you'll get the best speed, efficiency, and reliability for optimal Hadoop performance. To help supplement the processing power, the Supermicro turnkey 42U Hadoop rack comes standard with three primary/secondary name nodes with 64GB of memory per node, 20 DP data nodes with 32GB of memory, two 48-port switches, a management server, two PDUs, and 120TB of raw HDFS capacity.

In addition to the 42U rack solution, Supermicro offers standard, Twin, and FatTwin rackmount servers in 1U, 2U, and 4U form factors that have been certified to support Hadoop. From 1U up to 42U, companies have multiple rack solutions to choose from when finding the best hardware for their Hadoop deployment.

New Hadoop Data Nodes & Backend Storage Server

Supermicro offers a series of Hadoop infrastructure solutions that can be used to build the perfect overall storage system for your implementation. One such solution is the SYS-F617H6-FTL+, which is exceptional because the I/O is accessible from the front and it supports 12 3.5-inch hard drives plus two 2.5-inch drives per node. "It also has the highest power efficiency of any product on the market," Liang says. "Compared to industry-standard Hadoop 1U systems, this server achieves up to 20% less power consumption."

Supermicro also offers UP and DP servers that support up to 14 drives in a 1U form factor and minimize the cost per terabyte. All of these Hadoop solutions are connected with Layer 3 10GbE or 1GbE switches with 10GbE uplinks, depending on your configuration. Supermicro includes system and power management software with each solution so you can reach your maximum efficiency potential through load balancing.

For high-capacity backend storage, Supermicro's SSG-6047R-E1R62L double-sided storage server holds 72 external, hot-swap 3.5-inch hard drives at 18 HDDs per 1U. A 42U rack of these provides nearly 3PB of storage capacity at less than 10kW of power per rack under a normal workload. This system maintains high serviceability as all 72 drives are easily accessed from the front or back side, while redundant Platinum-level power supplies deliver superior reliability and efficiency.

Budget-Conscious Hadoop Solutions

Supermicro has always focused on making the best performing and most efficient storage servers, providing companies with the highest possible ROI. Customers benefit by getting the best bang for their buck.

"Our server engineers have enabled these systems with the best thermal and power designs, which provide customers with the best possible performance per watt and performance per dollar," Liang says. "And when customers buy our turnkey rack solutions, they not only benefit with quicker, easier deployments but also save money." P

Contact:
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Supermicro has always focused on making the best performing and most efficient storage servers, providing companies with the highest possible ROI.

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   - ❑ 10 to 99
   - ❑ 100 to 199
   - ❑ 200 to 499
   - ❑ 500 to 999
   - ❑ 1,000+

2. **How often do you purchase computer hardware/software?**
   - ❑ Weekly
   - ❑ Bi-weekly
   - ❑ Monthly
   - ❑ Quarterly
   - ❑ Annually
   - ❑ No Involvement

3. **What is your annual computer hardware/software purchasing budget?**
   - ❑ $0 to $9,999
   - ❑ $10,000 to $24,999
   - ❑ $25,000 to $49,999
   - ❑ $50,000 to $99,999
   - ❑ $100,000 to $249,999
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   - ❑ $1,000,000+

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Revolutionizing The PDU Power Cord

The PDU Power Pivot From Server Technology Adds 90 Degrees Of Rotation For Ultimate Flexibility

Server Technology has been at the forefront of PDU innovation since it was established more than 28 years ago. The owner developed the first intelligent PDU, which served as the foundation for the entire company. Now, almost three decades later, Server Technology continues to innovate through both internal research and by listening to the requests of its customer base.

"Just like every two or three years when you get a new PC, that's about how quickly things change in the data center," says Steve Hammond, product manager at Server Technology. "Customers don't want to have 20 or 30 custom products just to outfit all of their different data center configurations. If they can standardize on one design that is agnostic to the data center or the rack they're using, it helps them to reduce the amount of stuff they have to deal with."

That's just one of the reasons Server Technology adds new features to its products on a regular basis—about a quarter of the company's business comes from products launched within the past year.

In March, Server Technology will release yet another innovative PDU design with its patent-pending Power Pivot feature in four new products, changing the way data centers think about their rack configurations. In fact, Server Technology's goal is for companies not to worry about their configurations at all.

Innovative Cord Design, With An LED To Match

Server Technology's PDU Power Pivot is unique and revolutionary in that instead of having a static power cord, it sports a 90-degree user-rotatable cord that can be positioned in a variety of ways.

For instance, if your power distribution access points come through a raised floor or down through an overhead busway, you can use the PDU Power Pivot to rotate the cord for the optimal configuration. This new feature provides additional flexibility to support racks from multiple vendors. The Power Pivot can route around cross-bars and cable management without the need for additional brackets. Plus, the PDU Power Pivot makes implementation easier, because the cord can be rotated out of the way during installation and then moved back into position once it's set.

But the rotating power cable design isn't the only innovative part of the PDU Power Pivot. Units can also include an LED screen, used for monitoring purposes, that actually flips depending on the position of the device.

"The auto-flip display works just like your smartphone, and the advantage is that now the customer doesn't have to tilt their head or think about this reading that they have on the power strip," Hammond says. "When you combine that auto-flip display with the Power Pivot, you really have one product that you can use anywhere."

Each pair of PDUs features four ports that can be used for temperature and humidity monitoring. Server Technology has added this feature to comply with ASHRAE's recent thermal guidelines for at least three temperature measurements in each rack (top, middle, and bottom). These measurements can now be achieved directly through the PDU by simply plugging the sensors into each port.

> The rotating power cable design isn't the only innovative part of the PDU Power Pivot. Units can also include an LED screen, used for monitoring purposes, that actually flips depending on the position of the device.

"More and more, our customers are requesting additional measurements through the PDU, and some of this stems from where this product is located," Hammond says. "It's put in the rear of the rack in the hot aisle where all these servers exhaust their hot air. It's the hottest part of the data center, which is where you want to measure. This allows our products to comply with ASHRAE requirements without adding any other external devices."

Multiple Unit Options & Built-In Monitoring Features

The PDU Power Pivot builds on Server Technology's history of providing flexible PDUs, with the initial product offering of three new 30-outlet versions and one new 24-outlet version. The 30-outlet Basic unit is essentially "like a robust version of the power strip you might find under your desk with no intelligence," Hammond says, but is designed specifically for servers and other rack-mounted devices. The 30-outlet Metered unit adds the previously mentioned LED screen, which acts as a visual indicator for the infeed current draw so you can monitor the flow of electricity and make sure you don't "overload the strip, pop a breaker, or otherwise cause damage," Hammond says.

The 30-outlet Smart unit takes the Metered unit and adds environmental and power sensing. Your PDU has an IP address and can be monitored remotely from a control center or even from a Web browser. There's also a 24-outlet switched PDU that provides the ability to turn individual receptacles on or off at any time. "Just like if your PC gets hung up and you need to reboot it, the customer can go in there and reboot the server without physically having to walk out there and unplug the device or otherwise reset it," Hammond says.

More Innovation To Come

Although the PDU Power Pivot hasn't yet officially launched, Server Technology has already been receiving positive feedback from some of its key customers. And Hammond promises that the innovation won't stop with this iteration. Hammond says the company is "looking to roll this into more products later this year," with additional Server Technology PDUs incorporating the revolutionary Power Pivot design soon. P

Server Technology
Quality Rack Power Solutions

Contact:
(800) 835-1515 | www.servertech.com

FEATURED PRODUCT

Siemon Releases New Full-Line Catalog For North America

248-Page Publication Features The Latest Information On Siemon's Network Cabling, Connectivity & Data Center Solutions

Siemon, the global infrastructure specialist, released its newest full-line catalog for North America. Available at no cost, this 248-page publication features the latest information on Siemon's network cabling, connectivity, and data center solutions, including standards compliance, application examples, and detailed product specifications. Representing more than a century of Siemon expertise, this new catalog is the essential guide to the industry's leading commercial cabling products.

Latest Innovations

The new full-color, intuitive catalog details the latest innovations in each of Siemon's high-performance product sets, including performance-leading end-to-end TERA® Category 7_A/Class F_A , Z-MAX® Category 6A solutions, as well as a complete line of high-quality Category 6 and 5e copper cabling systems. The catalog also covers Siemon's comprehensive family of optical fiber cable and connectivity solutions, including MTP-based plug-and-play in addition to innovative cabinets, power and cooling, and intelligent infrastructure management for today's complex data centers.

This new full-line catalog also includes Siemon's most popular legacy products such as Siemon's CT Series Couplers and S66 Connecting Block options that were not included in recent Siemon System catalogs.

Some of the newest Siemon innovations featured in the new catalog include:

- Ultra-Efficient IcePack Cooling Door System, a scalable rear door heat exchanger that uses passive liquid cooling to offer a cooling capacity of 31kW per cabinet for challenging data center hot spots.
- Innovative Intelligent Power Distribution Units (PDUs) that distribute power to network equipment while providing real-time monitoring for saving energy and maximizing uptime in the data center.
- Feature-rich V600 Cabinets, a cost-effective 600mm (24-inch) server cabinet that is ideal for use with VersaPOD cabinets and provides lightweight stability, accessibility, and superior airflow.
- Universal Modular Furniture Adapter for securely mounting work area network connectivity in common modular furniture systems while maintaining performance-critical bend radius.
- New MapIT® G2 infrastructure management solutions, including an interconnect option for tracking connectivity between switches and smart patch panels and a plug-and-play multifiber option.
- High-quality RouteIT™ Cable Tray and J-hooks available in an array of sizes and mounting options to support a wide variety of data center and network pathway configurations.

The new catalog offers detailed information on Siemon's comprehensive line of products:

- End-to end copper and fiber network cabling and connectivity solutions
- Fiber enclosures and splicing accessories
- Intelligent infrastructure management
- Work area products and accessories
- Racks, enclosures, and cable management
- Data center cabinets and power and cooling solutions
- High-speed interconnects
- Ruggedized/industrial connectivity solutions
- Specialty tools and testers

For a free copy, visit http://www.siemon.com/catalog. P

Siemon Product Catalog

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The essential guide to the industry's leading commercial cabling products, including Siemon's comprehensive line of products and its most popular legacy products.

FEATURED PRODUCT

Cooling That's Effective, Affordable & Energy-Saving

Evaporative Cooling Completely Eliminates Need For Compressor-Based Systems

One of the big names in server manufacturing recently released a new generation of servers that will work very well under the new ASHRAE TC 9.9 guidelines for data center design and operation.

This new generation of servers can handle temperature extremes of up to 45 degrees Celsius, or 113 degrees Fahrenheit, for up to 90 hours per year. One of the rationales behind marketing the server at those conditions was to allow fresh air cooling in virtually the entire continental United States. Other research has indicated that the servers can operate 87% of the year in Washington, D.C., using fresh air cooling alone.

Energy-Saving Potential

The energy-saving potential of raising the inlet temperatures that high can be enormous. Instead of running chillers or compressors 8,760 hours a year, they are only operating 1,138 hours per year.

It's difficult to put that into numbers, but here's a little example:

If the server power consumption is 300 watts, then the cooling system must remove 300 watts times 8,760 hours per year or 2,628kWh of heat (8,961,480 BTU). That can be accomplished using mechanical cooling, fresh air cooling, or a combination of the two.

A pretty efficient compressorized HVAC system will remove about 4.5 watts of heat per watt of electrical energy used. So to cool the new server using mechanical cooling will require 2,628,000 watts of heat divided by 4.5, or 584kWh of compressor power.

To cool that same server using fresh air for 87% of the year will only require 75.8 kWh of compressor power. Of course, the fan energy stays the same in both cases, but the compressor savings of 508.2kWh per server can really start to add up.

At an aggressive electric rate of 4.5 cents per kWh, that amounts to $22.87 per server per year. At modest densities of, say, 40 servers per rack, the savings amounts to $915 per rack per year. Now consider how many racks are in the typical server room or data center. If the data center has a server load of 1mW, then a density of 40, 300-watt servers per rack will translate into 83 racks. So the annual savings would be almost $76,000 in this example.

Mestex Aztec Evaporative Cooling System

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Even Greater Savings

To make the savings even greater, you could use the Aztec ASC indirect evaporative cooling system. Using the Aztec system completely eliminates the compressor-based cooling, adding another $3.50 per server per year of savings. That would add another $11,620 per year in savings for a total annual savings of $87,620 in this example.

Of course each climate and data center is different, and Aztec analyzes each case. But the reduction in operating costs are significant in every case that Aztec has studied.

Aztec and its sister company, Alton, have been in the evaporative cooling business for 66 years. Many of the evaporative cooling technologies that are just now being introduced to the market were developed more than 20 years ago by Aztec. Our experience, combined with our state-of-the-art controls, can assure you of the most efficient evaporative cooling solution available. P

CPS, LLC
U-X3 Universal AC Power Switch

Computer Peripheral Solutions, LLC manufactures numerous products that are targeted towards very economical problem resolutions and increasing efficiencies within various niches in today's networking, such as local and remote controlled power devices, remote switching, telephone line sharing and dial security. They can be used in a variety of applications such as kiosks, monitoring equipment, security systems, observatories and lab/test centers, to name a few. Most units offer several different types of control, for example: USB, Wireless, ring count, touch-tone, cell and web. The products range from a single box to the more flexible and scalable modular systems.

The U-X3 (pictured above) is an economical, but extremely flexible AC power control device that can be used to control the AC power to three different devices via Ethernet, USB or Wireless.

The products were developed as a result of specific user requirements, others as OEM products while still others evolved solely on speculation. This has resulted in a rather diverse product line and has also served to expand the company's technology base.

Contact: (800) 888-0051 | www.cpscom.com/pm

RLE Technologies
FMS-Facilities Monitoring System

The FMS is a feature-rich environmental monitoring system offered at a very competitive price point. Commonly used to monitor equipment status and summary alarms as well as sensors for temperature, humidity, current, voltage, and more, the FMS hosts its own web pages – access the FMS through a web browser to view data and configure the system. The device has no internal moving parts – no hard drives or fans – so it is highly reliable: no crashed hard drives and no downtime! System integration is easy – the FMS is third partner savvy / vendor neutral, so integration options are limitless. Contact RLE for an FMS demo today!

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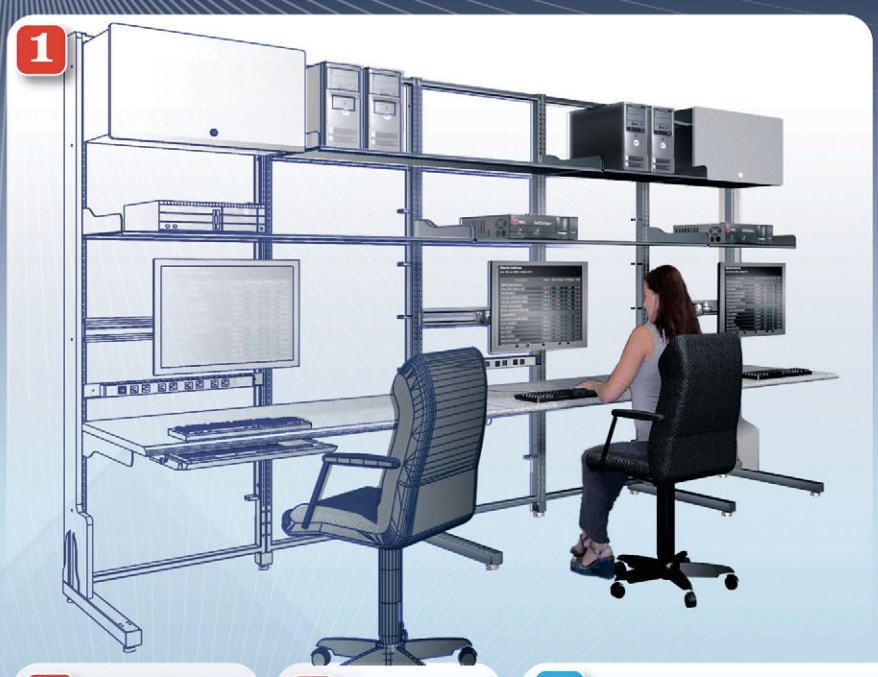

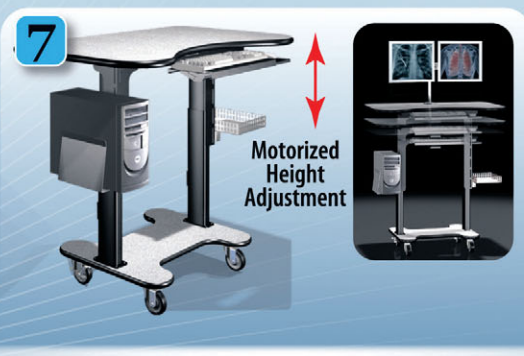

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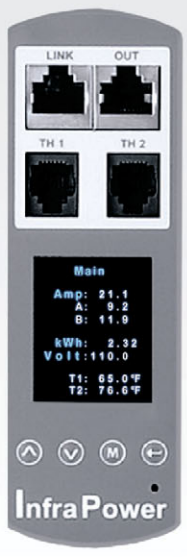

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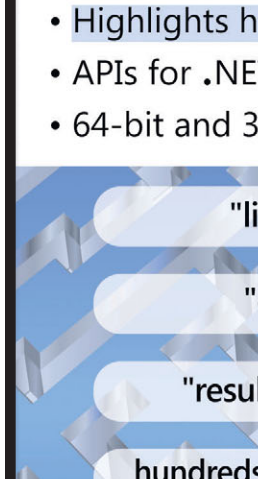

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Enterprise App Stores A Good Choice, But Only If Used

Enterprise app stores offer greater control over the apps used by employees, greater control over software expenditures, and greater negotiating leverage with app vendors, according to research firm Gartner. But it's all for nothing unless the enterprise app store is widely adopted. Gartner expects that, by 2017, 25% of enterprises will have an enterprise app store, which provides better management of corporate-sanctioned apps on PCs and mobile devices.

Gartner offers several recommendations related to enterprise app stores:

By delegating choice to end users, they can choose the program they think will best meet their needs and know that the ultimate cost will require management approval or be charged back to their business unit.

The enterprise app store needs a dynamic selection of apps to choose from so users continue to visit the store. Use the app store as a way to share new apps, recognize great applications, and provide feedback to development teams.

Begin by assessing the need for an enterprise app store and look for providers that offer cross-platform support. An app store should be part of an overall mobile device management bundle.

CEO Survey Identifies Confidence, Concern

The rapid speed of technological change is causing concern among technology CEOs about competition and industry disruption, according to the annual CEO survey conducted by PricewaterhouseCoopers. The PwC report shows that CEOs across all industries are slightly less confident about this year's economic outlook, but 84% of technology CEOs are confident they can raise revenues this year. When compared to CEOs across all industries, technology CEOs are also more optimistic about the next three years.

Other major findings from the PwC survey of technology CEOs:

58% are concerned about **government over-regulation** (up 6% from last year)

74% plan to change company strategy in the coming year, including focusing on **customer growth, innovation, and new products and services** to be better equipped to deal with challenges cause by regulations.

61% cite **growing the customer base** as the top investment priority for the next 12 months.

84% are enhancing their company's focus on **social media**.

37% view **new products or services** as their company's main opportunity for growth.

Shortage Of IS Professionals Impacts Economy

More than half of information security professionals feel their security organizations are short-staffed, according to the "Global Information Security Workforce Study" conducted by Frost & Sullivan for (ISC)². This shortage of skilled professionals is leading to more frequent and costly data breaches, the study shows, with hacktivism, cyber-terrorism, and hacking among the top concerns. "This shortage is causing a huge drag on organizations. More and more enterprises are being breached, businesses are not able to get things done, and customer data is being compromised," says W. Hord Tipton, executive director of (ISC)². The study found that information security professionals enjoy stable employment but that new skills are needed to meet challenges such as BYOD. Application vulnerabilities are one of the biggest security concerns cited in the study, yet most security organizations are not involved in enterprise software development.

Report Looks At How Shift In Software Sales Model Impacts Pricing

As enterprises increasingly shift their workloads to the cloud, the way they purchase and use software applications is shifting with it. Because of this, PricewaterhouseCoopers reports that the software industry is undergoing dramatic changes in its sales model, from licenses to services, which will ultimately impact pricing. "Constant innovation and evolution in the software industry markets and business models require new pricing strategies," according to the report. "By combining analytics with formalized processes and standards, companies can get on a path toward a more coherent, organization-wide pricing model that delivers proven results," says Mark McCaffrey, PwC's global software leader.

Entrepreneurs Intend To Hire More In 2013

More than half (54%) of the "600 plus major entrepreneurs" surveyed for Ernst & Young's latest report on global jobs creation say they plan to expand their workforce this year. Most of those surveyed (74%) also say they increased headcount in 2012. Looking forward, innovation is what these entrepreneurs are after, and 90% of them feel that innovation is a key differentiator between their businesses and the competition, according to Ernst & Young. When it comes to applying that innovation, 44% report having a "structured process in place to drive innovation," while 41% view innovation as relying more on spontaneity.

Android, iOS Dominate Smartphone Market

The Android and iOS smartphone operating systems accounted for 91.1% of all smartphone shipments in the fourth quarter of last year and 87.6% of all shipments for the full year 2012, up from 68.1% in 2011. Those numbers were released by IDC in its "Worldwide Quarterly Mobile Phone Tracker" report. The Android OS had triple-digit growth last year, IDC reports, and, while iOS had double-digit growth during the fourth quarter, its year-over-year growth has slowed compared to the overall market. But there is room for competitors, IDC notes. "With the recent introductions of two new smartphone platforms, we expect some ground to be made by the new entrants over the coming years," says Ryan Reith, program manager with IDC's Mobile Device Trackers.

LTE Gaining Momentum

The LTE market has shown significant growth over the past 12 months, according to Juniper Research. The momentum has been primarily dominated by enterprises, but consumer subscribers are expected to sign up in volume this year and will overtake the enterprise subscriber numbers by 2015, Juniper data shows, although the consumer sector will account for less than half of all revenues. Revenues from 4G LTE, at about $75 billion this year, are expected to reach $340 billion by 2017. About 70% of LTE revenues will come in the North America, Far Eastern, and China markets. Timing of availability and the cost of the spectrum are two major factors in the speed of LTE rollouts, Juniper reports, as 4G LTE investments can take several years to recoup.

Report: Execs Need To Increase Technology's Potential

Companies are doing a relatively poor job of maximizing the business potential of technology, according to a recent survey by research firm Gartner. Digital technologies such as mobile, big data, social, and cloud have reached a point where execs have no choice but to increase technology's potential in the enterprise, according to Gartner. This will require CIOs to evolve their strategies, priorities, and plans beyond tending to the usual concerns, even as they expect their 2013 IT budgets to remain relatively flat for the fifth straight year, Gartner reports. "Digital technologies provide a platform to achieve results, but only if CIOs adopt new roles and behaviors to find digital value," says Mark McDonald, group vice president and Gartner Fellow.

Near-Future Social Business Benefits Questionable

Mixing social media with business isn't automatically a godsend, nor is it a fruitless endeavor, and incorporating social technologies into the workplace is not as straightforward as it might seem. This complexity can result in social business initiatives that lack specific goals and clear implementation paths. As a result, in the next couple of years, social business runs the risk of looking like a fad that just didn't work out. Gartner addressed this problem in a recent report, which claims that by 2015, 80% of social business endeavors won't deliver on anticipated benefits. "Businesses need to realize that social initiatives are different from previous technology deployments," says Carol Rozwell, vice president and distinguished analyst with Gartner. Instead, she suggests, businesses must not try to "push" social media but instead get "opt-in," lest social media become another tool that employees don't use.

Identity Fraud Reaches Three-Year High

According to a new report from Javelin Strategy and Research, identity fraud incidents reached a three-year high in terms of dollar amount stolen in 2012, with $21 billion in identity fraud-related theft. This figure is less than half of the $47 billion all-time high mark set in 2004, but the recent uptick is alarming, and currently there is an average of one identity fraud incident every three seconds, Javelin states. Report findings suggest that identity thieves might be getting savvier and quicker with their attacks, as they used their victims' information for 48 days on average in 2012, compared to 55 days in 2011 and 95 days in 2010; also, more than half of victims had been actively monitoring their accounts to avoid such attacks.

Help For Authentication & Password Woes

According to Gartner, SSO (single sign-on) solutions are useful for enterprise organizations needing to cope with large numbers of employees who regularly use multiple passwords. In fact, Gartner reports, by 2016, federated SSO, whereby each individual can immediately gain access to numerous password-protected sites and services using a single username-password combination, will be a necessity for 80% of large businesses. Gregg Kriezman, a research vice president with Gartner, suggests that organizations "identify the tactical and strategic approaches that reduce enough of the problem space over time and within budget," as some SSO solutions may be overpriced relative to an organization's needs.

Mergers & Acquisitions Down At Close Of 2012

According to financial advisory firm Ernst & Young, worldwide M&A (mergers and acquisitions) declined 35% in 2012, from $175.7 billion in 2011 to $114.1 billion in 2012. "At the same time," the report says, "2012 deal volumes held up: it was only two deals less than 2011," with "big-ticket deals above $1 billion" accounting for most of the year-to-year shortfall. One bright spot in 2012 was the cloud computing category, specifically SaaS (software as a service), which represented more than 15% of technology M&A deals, according to Ernst & Young. The firm also pointed to big data analytics, smart mobility, social networking, security, mobile finance, healthcare IT, and advertising and marketing as primary M&A drivers in 2012.

SIX QUICK TIPS

Improve VoIP Quality Of Service

Address Network, Traffic Prioritization & Other Issues

Paying attention to the quality of service of your VoIP implementation from the outset is critical for numerous reasons. "We've had so much success and become so accustomed to the high quality and high availability of the traditional publicly switched telephone network that any decrease in quality [with VoIP] is a recipe for having your users be unhappy, no matter what you do after the fact," says James McCloskey, senior research analyst at Info-Tech Research Group.

There are several avenues enterprises can take to help ensure and maintain VoIP QoS, including monitoring and prioritizing traffic. Here are a few tips to consider.

✔ Bulk Up On Bandwidth

You can invest in routers and switches with configuration tools that help manage traffic, but the bottom line is that you need to make sure your enterprise network can handle VoIP.

McCloskey says sufficient bandwidth generally isn't an issue at individual LAN segments or end points but rather at the network's core, where the simultaneous handling of multiple call streams and other real-time and non-real-time traffic occurs. "That's where you're going to have to put the focus," he says. "If you don't ensure that sufficient bandwidth, it's going to be almost impossible to provide a good-quality experience."

McCloskey says enterprises can encounter contention with bandwidth and QoS during periods when users are likely to engage in personal Web surfing and downloading, such as lunchtime. "This is where it becomes critical that voice traffic gets prioritized first so that personal downloads and browsing don't affect negatively the voice experience, which relies on the real-time delivery of packets."

Nick Mueller, technical architect for video and telepresence at CDW, says the rule of thumb, especially for lower-speed WANs (1.5 to 5Mbps), is reserving no more than 30 to 40% of link bandwidth for real-time traffic (voice media, for example).

If the peak number of calls overruns 30 to 40% of link speed (512Kbps of a 1.5Mbps link, for example), increase link speed vs. increasing the percentage allocated to real-time traffic. "Using a lower-bandwidth code (G.729, for example) may increase the number of calls your link can sustain, albeit at a slightly reduced call quality," he says.

✔ Prioritize Traffic Based On Value, Mission

Where prioritizing traffic is concerned, Rob Arnold, program manager, Unified Communications and Collaboration at Frost & Sullivan, says to prioritize bandwidth resources for high-value or mission-critical applications, users, and locations. Granting VoIP traffic priority over email, streaming video, and other applications and ensuring service

for the sales department, for example, can "minimize disruptions during peak periods of bandwidth demand on the network," he says.

McCloskey says to look to VLAN tagging and true QoS to ensure that real-time packets are delivered and prioritized.

✔ Monitor Call Quality, Network Performance

If your enterprise can only focus its efforts on one thing, McCloskey says, it should be to at least make sure that call quality logging is in place on the system. Without call and network performance logging, he says, you have no hope of diagnosing problems as they crop up. Thus, even if you can't allocate resources toward VLAN tagging, he says, at least be capturing the data that would be necessary "so that if and when the problem crops up, now you can start to diagnose it and focus your efforts in hindsight, if you will," he says.

Frost & Sullivan's Arnold says enterprises can work quality-of-experience and MOS (mean opinion score) measurements into their QoS parameters. Although subjective, the measurements present the users' perspective on application performance, he says, thereby providing IT and other technical service staff feedback in a live environment.

For enterprises with a network management system in place, CDW's Mueller says to "put your QoS into monitoring, especially WAN QoS. This will give you a good idea of both usage trends and drops."

✔ Start With A Smaller, Contained Pilot Program

Rather than roll out one big VoIP implementation enterprise-wide, McCloskey advises first using a smaller, contained pilot group that implements all management and monitoring procedures. Beyond providing a good baseline to build out from, this will "build a comfort level with the system so there aren't big surprises when the big load goes up," he says.

The pilot, McCloskey says, should be an end-to-end implementation but avoid involving mission-critical users of telecom who can't afford an outage. Instead, use group members who can effectively communicate via email or IM if an outage occurs.

"Look at the pilot not as, 'Where am I going to get my biggest bang?' but 'Where can I get the greatest opportunity to prove out my internal processes?'," he says.

The pilot should position the enterprise so it's not playing catch-up with the management and monitoring, he says. If you are playing catch-up and "you've gone with a big-bang implement of the VoIP but you don't have those tools in place, you're really going to have a hard time maintaining the operations and improving the quality at the same time," he says. P

✔ In-House Or Hosted?

It may be worth considering a hosted VoIP solution rather than implementing an on-premises system. Self-managed on-premises systems give companies full control but often have a higher upfront cost, while managed on-premises or hosted systems often have a lower cost but give businesses much less managerial control.

Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says to ask yourself, "Do I have the appropriate cabling infrastructure in place to support the VoIP solutions? Are there dual CAT 5 drops to each workstation, or am I having to daisy-chain my workstation PCs into the phone and the VoIP into the jack?" Depending on your answers, your infrastructure might not even be able to support in-house VoIP, which will limit your choices.

On top of infrastructure, you also have to analyze your workforce. You may have employees who are familiar with using VoIP solutions but don't have the expertise to manage them. If this is the case, you would have to hire new employees or bring in an outside expert to train members of your IT department.

✔ Make Sure Your Network Is Ready For VoIP

Whether you're rolling out a VoIP implementation for the first time or expanding an existing deployment, "first and foremost, conduct an extensive network readiness assessment prior to implementing VoIP," says Rob Arnold, program manager, Unified Communications and Collaboration at Frost & Sullivan.

This network readiness assessment will detail the network's capacity, which existing network components can support packetized voice, and which components need upgraded or replaced. "These expenses, therefore, can be factored into the overall cost of deploying VoIP applications," he says.

BONUS TIPS:

✔ Communicate With Other Departments

James McCloskey, senior research analyst at Info-Tech Research, says that before traditional telephony began shifting to IP-based telephony, companies typically had separate telephony and network groups to deal with telephony issues. "Today, organizations need to make sure they're delivering the VoIP service as a network service," he says. Thus, the groups must conduct "a lot of cross communication . . . otherwise, you end up with a lot of finger pointing."

✔ Work Closely With Vendors

When prospecting VoIP vendors, request demonstrations in live environments, says Rob Arnold, program manager, Unified Communications and Collaboration at Frost & Sullivan. Nick Mueller, technical architect for video and telepresence at CDW, says selecting a VoIP vendor with considerable integration guidance and documentation with your route-switch vendor can greatly help in implementing and maintaining correct QoS on your LAN and WAN.

SIX QUICK TIPS

Ensure The Success Of A DCIM Implementation

Key Things To Consider When Moving Through The Typically Difficult Process

Data center infrastructure management (DCIM) solutions are proving popular because they help bring all your data together so you can make more informed decisions. But in order to receive those benefits, you have to make sure the implementation goes as smoothly as possible. It's important to consider features, ease of use, and how you plan to use your DCIM solution, but it ultimately starts with finding a vendor that will provide the best possible solution for your data center.

✔ Watch For True DCIM

"There are many vendors describing their toolsets as being in the DCIM space because it is a dynamic and exciting area to be in, but it is often a bit of stretch," says Simon Mingay, research vice president at Gartner. "Part of the challenge of the DCIM market is that it remains immature, with a very wide spectrum of providers all coming at it from different directions, including facilities, IT hardware cooling, modeling, and spatial layout of hardware."

Gartner estimates that there are about 25 vendors that fit its DCIM definition of tools capable of monitoring, managing, and/or controlling major data center assets and resources. But about 70 vendors claim to be in the market. That's why Jay E. Pultz, vice president and distinguished analyst at Gartner, recommends companies look for reference accounts whenever possible and "talk to people that actually have it installed and are using it more than in a beta or proof of concept" capacity.

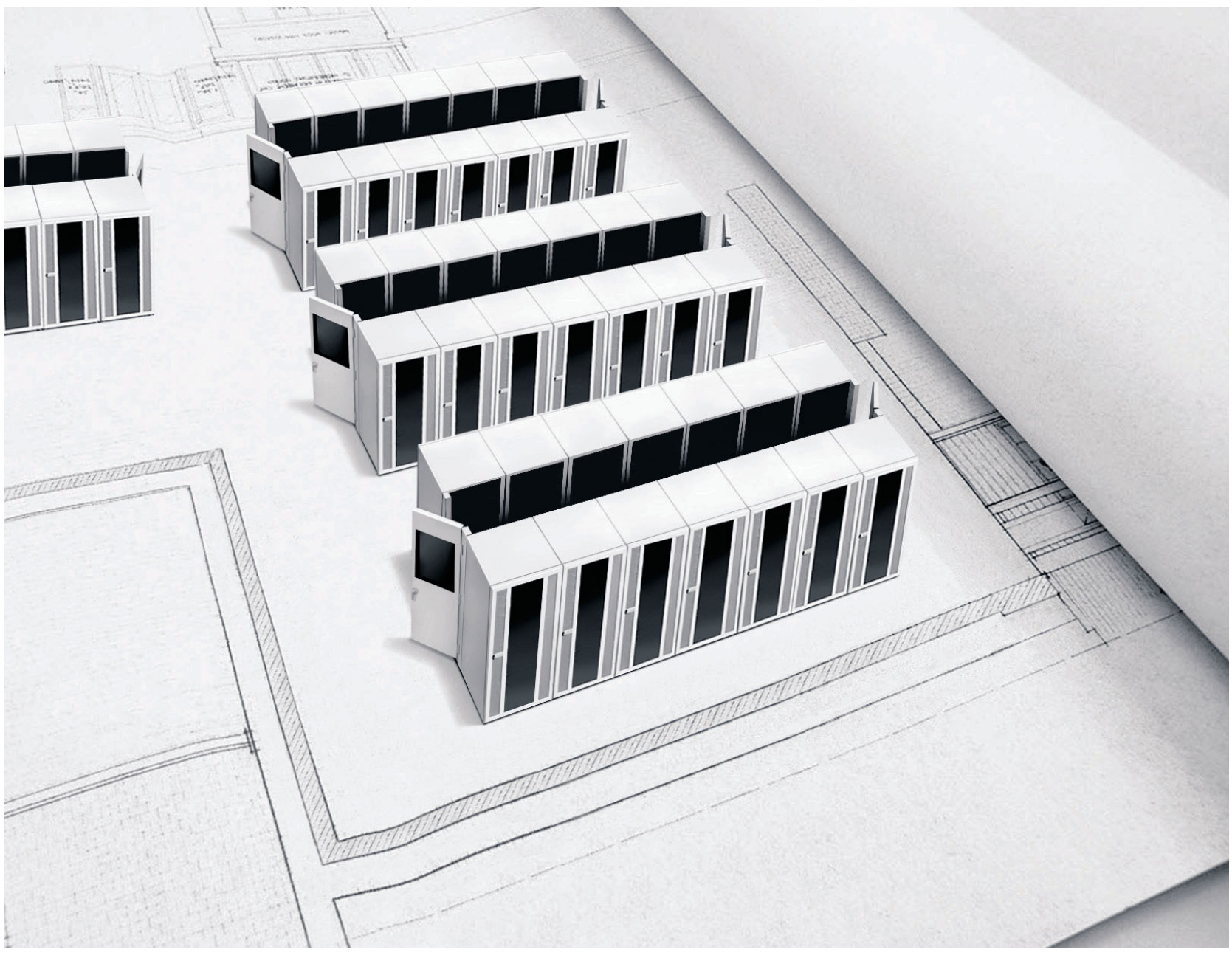
✔ Know How You Will Use DCIM

There is a "lot of talk about all the bells and whistles" when it comes to DCIM, says Jennifer Koppy, research manager at IDC. But organizational buy-in should come before talking features, she says.

"DCIM is extremely powerful and can really support huge business systems," Koppy says. "So I think it's really important to first have buy-in from people on the facilities side, IT side, and then the C-level executives making over-arching decisions. I think having a tool that enables those teams to work together is really the first step if you want to have it be a successful implementation."

DCIM solutions can be used to help make business decisions. With energy management, for example, you can use a DCIM solution to monitor temperature and humidity at the top, middle, and bottom of the rack, Pultz says. This is a "minimal requirement," however, and "it should do more than just give you metric," he says. For instance, the tool should be able to do "trending analysis" or give you a "heat map of the data center to identify where the hot spots are," among other features.

A DCIM solution should also be able to help you figure out where to put new equipment. "What typically happens in a data center is, say, 20 servers arrive," Pultz says. "You look around and say, 'Hey, there's some space over there and there's some power, so let's put it over there.' You do that a couple dozen times, and you're very far from optimal in how the data center is configured."



Ultimately, Koppy says, DCIM is such a broad "umbrella collection of tools" that the solution you choose depends on what you're trying to accomplish. "Some implementations are more custom where you pay a lot more in services to get things up and running, and other DCIM vendors have a lot of standard pre-built templates that speed it up, so you end up paying less for the services and more for the software itself." It's important to determine what your needs will be from the beginning, so you don't get stuck with an expensive solution that isn't what you need.

✔ Opt For A User-Friendly, Layered Solution

It's easy to get wrapped up in looking for the best feature sets and performance from a DCIM application that you can forget to make sure employees will be able to use it. "What we have customers telling us today is that there are so many advanced features, but less focus on how easy they are to use," Koppy says. "If you have someone that's less skilled doing a lot of data input or isn't familiar with the tool, then they aren't going to be doing it. The data that you get out is only as good as the time that you spend putting it in."

Another way to solve this problem is to create a layered DCIM approach where people at different levels of the company only receive information pertinent to them. For instance, Pultz says that many of Gartner's clients use multiple levels for DCIM so that a "data center operator is getting the most detailed view, the data center manager is getting an overview, and the CFO might be getting a view of how much energy is costing."

✔ Prepare For Installation

Pultz says DCIM implementation is "still not easy." Traditional DCIM solutions were "very manually intensive systems to implement," he says, and current offerings have improved upon that, but there is still a lot that goes into a DCIM installation.

"You want to make as best use of existing data sources as you can, like an IT asset management system and CMDB and things like SNMP feeds from the major pieces of equipment," Pultz says. "You're also going to have to put in additional sensors to augment the feeds that you have. Those are typically wireless sensors that again measure three points on the racks. The other thing that can happen is you can't get a data feed from everything, so there will be things like non-smart PDUs, and you'll need to add things to them so that you can measure them and estimate them, or not include them."

It typically takes a couple of months to fully implement a DCIM solution, Pultz says, but it really depends on how much help you receive from the vendor. He recommends you express certain levels of support in the contract, and make sure you feel comfortable with what the vendor offers before signing. If you can find a vendor that views it as a partnership rather than a standard buyer-seller relationship, the vendor should help make the DCIM implementation process much easier. P

✔ Have The Right Staff In Place

DCIM solutions aren't necessarily complicated in terms of the types of data they gather, but it can still be difficult to implement and operate one on a daily basis if you don't have the right experience.

"These are new types of information, so IT operators have to understand what does this mean, what should I look for, what's a red flag, and how do I integrate this energy and asset data into other things that I have?," says Jay E. Pultz, vice president and distinguished analyst at Gartner. "Training the operators to really use this is important. If you have a tool, but no one's trained in it, then it might as well remain in its shrink wrap, because it's not helping anyone."

✔ Aim For Maximum Integration

There's potentially a lot riding on your DCIM solution, so spend time making sure you get the right fit. "The key thing is just making sure that the solution can integrate with the rest of the tools that you have in place, because this is something that can start off with monitoring every little detail in the data center and then that data can feed up into making some pretty big decisions about what you're going to do with the future of the company," says Jennifer Koppy, research manager at IDC.

"To get the true value," she says, "it needs to interoperate very well and play nicely. The free-flowing information back and forth is really a key aspect to those providers that are going to have a great solution as opposed to a good-enough solution."

BONUS TIPS:

✔ Implement DCIM In Phases

"This is probably not a one-fell-swoop kind of thing," says Jay E. Pultz, vice president and distinguished analyst at Gartner. "You want to phase it in. Start with racks where you know that the equipment is well-instrumented and any places that you know you have a high power density in the rack. When you get up to like 10kW per rack, you want to keep real good track of those things, so you don't have problems."

✔ Look For SaaS-Based DCIM In The Future

DCIM vendors typically charge per rack and then calculate one lump sum for the entire implementation, but that could be changing in the near future. Jennifer Koppy, research manager at IDC, says that SaaS versions of DCIM solutions should grow in popularity and go to a monthly fee per rack per month or for how much bandwidth is used, rather than the one large up-front cost. "It will definitely make it an easier chunk to absorb and consume for a lot of companies," she says.

HOW TO

Rethink Your Position On Blade Servers

Determine If It's Time To Bring A Blade Server Aboard

It's possible that when blade servers first hit the scene, you were intrigued by their promise to pack more processing power into less space and the consolidation abilities available. For various reasons, including compatibility and pricing concerns, many enterprises chose not to initially implement blade solutions. In these areas and others, blade servers have made strides to the point that adopting a solution warrants reconsideration.

Note The Changes

Today's blade solutions are based on Intel and AMD x86 processors, something Charles King, principal analyst at Pund-IT, says translates into greatly improved system performance as those architectures have evolved. "In addition, with x86 systems driving so much growth in virtualization and cloud, blade-based solutions are playing greater roles in those markets," King says. "In fact, several vendors are delivering blade-based solutions designed specifically for cloud and virtualization applications."

John Sloan, lead research analyst at Info-Tech Research Group, says that when blade servers were originally introduced, their primary use was seen as being in high-performance computing clusters. "Their economical form factor meant a high-performance cluster (a cluster of synchronized servers running the same application) would have a smaller data center footprint. Limitations on processing, memory, and I/O made them less ideal for consolidation and virtualization," he says. Blade servers also suffered from problems related to heat density, so "you could have a smaller footprint, but your data center cooling requirements would go up," he says.

In recent years, however, Sloan says in addition to using powerful multicore x86 processors, blade servers have featured greater memory accessing ability and greater I/O bandwidth, traits enabling blades to be solid virtualization and consolidation platforms with strong market growth. "Blade popularity grew exponentially between 2006 and 2010, where there was a 400% increase in blade server adoption," Sloan says. In 2009/10, he says, converged systems based on blades became the new market direction.

Why You Should Reconsider

Initially, enterprises said no to blade servers for various reasons. Sloan says ultimately purchasing considerations come down to capacity, scale, and total cost factors. "How much processing do you need? In our cost modeling, we found that blades only became cost-effective once you had more than seven or eight blades in a chassis (depending on the vendor)," Sloan says. From a TCO perspective, he says, buying a blade rack/chassis and only two or three blades was more expensive than buying two or three rack-mounted servers. Thus, if an enterprise were consolidating servers and virtualizing them and had the option of hosting a few dozen servers or two or three traditional servers with shared storage, it likely didn't need blades.

Key Points

- Blade solutions have improved in areas of processing, memory, and I/O.
- Current blade servers include multicore x86 processors that can power virtualization and cloud computing applications.
- One current trend in blade solutions is packaging servers with integrated storage and networking components.

Today, Sloan says, server considerations are "still about capacity, scale, and total cost." Now, however, vendors have mini-blade products featuring essentially a single rack of six or so blades and integrated shared storage. Additionally, he says, there may be projects that necessitate suddenly adding a lot more capacity. "For example, even a smaller company might find it needs to host hundreds of virtual machines for a new VDI (virtual desktop infrastructure) initiative," he says. Various vendors have been taking advantage of these requirements with package blade systems for VDI, he says.

King says given today's continuing economic pressures, many companies are seeking ways to lower IT costs. Because blade systems are suitable for various efficiency scenarios, including system/application consolidation, cloud deployments, and downsizing IT facilities, he says, they deserve to be evaluated.

Seeking Vendors

When seeking out vendors, King advises sticking with vendors that have a history in developing blade solutions. "Fortunately, blade systems have been around for so long now that they've been battle-tested across a range of scenarios and industries," King says. "That means there's lots of data available for companies to chew on." He specifically suggests getting a vendor's pitch for both blade offerings and similar, non-blade solutions, as well as success stories from customers whose situations are similar to yours. "Finally, comparison shop. If you're looking for x86-based blades, there are a lot of solutions to choose from."

Sloan says that most differentiation in blade servers doesn't come from the blades themselves but from the systems they plug into, including the chassis and the "broader converged platform for which they are the processing engines." Unlike standalone x86 servers, which are "standardized and open" in the sense they're all based on the same internal architecture, he says, blade systems are proprietary. That said, Sloan says there are still onboard factors to consider, including how much memory a single blade can address, something important for efficiently hosting virtual machines.

Dig Deeper

Beyond basic evaluations and comparisons, determine the management tools the vendor integrates and the advanced features the solution itself supports. Advanced features and functions Info-Tech evaluated for a recent blade vendor overlook included if a solution's architecture extended to a non-x86 foundation so that the system can include x86 and non-x86 processors. Other evaluations addressed convergence over 10GbE, dynamic power management, memory extension technology, and network port virtualization. Sloan also suggests evaluating for hardware redundancy ("blade clusters are redundant across blades, but how about onboard redundancy, as in dual power supplies per blade?") and layer ownership ("does the blade vendor also own the other parts of converged infrastructure, such as network and storage assets?")

King says much of the market is moving to a model in which solutions combine servers, storage, and networking components into a "deeply integrated whole." Some systems, he says, are optimized for specific business applications and workloads, but in many cases "they are extending the approach and form factor pioneered by blade-based systems. In other words, blade products have shifted from being a clever design to becoming an industry trend." This, he says, testifies to the technology maturity and should assure potential customers that blade investments should hold their value.

Top Tips

- ✔ **Think long-term.** Charles King, principal analyst at Pund-IT, says premium pricing has always been the biggest barrier to acquiring a blade system. "The argument has been that blade systems allow customers to save so much on management, support, and facilities expenses that the higher cost is justified," he says. But convincing buyers to take a short-term price hit for long-term gain has been tough, he says.
- ✔ **Avoid per-blade cost comparisons.** John Sloan, lead research analyst at Info-Tech Research Group, says when making budgeting considerations for blade servers, consider the whole blade system (blade, chassis, management, etc.) in the TCO. "Per-blade cost comparisons are not very useful," he says.
- ✔ **Know the finer support details.** When planning support needs for a new blade system, determine how support is delivered, who will show up if there's a problem, and the proximity of replacement parts, Sloan says.

Action Plan

- Ask questions concerning capacity, scale, and total cost to determine cost-effectiveness.
- Ensure the current infrastructure is compatible with the solution that's being considered.
- Compare vendors, asking for bids for blade and similar non-blade solutions.
- Compare blade server against blade server but also blade system against blade system.
- Determine the management tools the vendor incorporates.
- Verify the support included, how it's provided, and training and/or certification required.

Get Started

Beyond comparing vendors and ensuring compatibility with existing equipment, enterprises should evaluate IT staff. For enterprises deploying their initial blade system, Pund-IT principal analyst Charles King advises evaluating the system and determining if it will need additional management and service training and/or certification. "That could be a major issue that spells the difference between what seems like a great deal and a technological money pit," he says.

SIX QUICK TIPS

Know Your Options For Cloud Storage

Analyze The Advantages & Drawbacks, Then Pick A Provider That Offers What You Need

THE CLOUD IS BECOMING an increasingly attractive destination for various enterprise storage purposes. An Aberdeen Research Group study, for example, cites the top benefits of cloud storage as better archiving, reduced need for on-premises storage devices, and the ability to focus on more strategic projects.

Gene Ruth, research director for storage at Gartner, says although it's important to not oversell cloud storage and to use caution, he's very positive about cloud storage. Beyond possessing considerable potential, he says, cloud storage has become a credible option for certain scenarios. Here are tips to help determine when cloud storage is a good fit and how to select the right provider.

✔ Recognize The Benefits & Drawbacks

Because the cloud storage market is still developing, there's bound to be performance, reliability, and pricing concerns, says Trenton Baker, vice president of development at DataON Storage (877/512-0432; www.dataonstorage.com). He recommends conducting a cost/benefit analysis.

Generally, startups and small to midsized enterprises seeking to "be leaner and meaner with a limited IT department or a smaller overall staff" can benefit from managed private or public cloud storage offerings, he says. This includes firms not prohibited by policy from using cloud storage or bound by bandwidth or large data growth concerns.

Although an industry has formed around putting backup services in the cloud, putting primary data in the cloud using cloud storage gateway devices is one of the more interesting trends, Ruth says.

These gateways "look and feel like file servers" but actually put data in the cloud and possess large cache, encryption, WAN optimization, and deduplication and compression capabilities. "There's even some capability to run server virtualization using the cloud storage gateway as a storage device as long as the server virtualization doesn't get too big," he says. On-premises, "it feels like you're running your files locally" but the provider handles backups and disaster protection, which simplifies the job for smaller IT organizations, he says. "For me, that's the big payoff for smaller companies using cloud storage, and all the technologies and all the products that make that happen are all evolving."

Consider budget, security, ISP reliability, and data load patterns to determine if cloud storage fits within the company culture and structure, Baker says. Also note if your industry allows for cloud storage. "Some industries, such as medical, government, and certain law firms, require added security that cannot be achieved in the public cloud," he says. Small to midsized enterprises should consider data safety, protection, and access, he says.

Beyond security, Ruth says, a serious drawback to cloud storage can be

performance that isn't able to support given workloads. "To fend against that, it's important to do a proof of concept," he says. "Cloud is not a panacea . . . It definitely could have performance issues." Companies approaching petabyte data scales, he says, should question whether they'd "be better off building their own private cloud storage environment vs. public, particularly if it's pretty active data."

✔ Look Beyond Provider Security

Security and handing over maintenance of the company's data have long been concerns of companies pondering the cloud. Thus, a provider's credibility is paramount. "Can you trust them to stay in business, to have the kind of data availability you're going to require to keep your business intact?," Ruth says. "We're now a couple years into it, and I think we're having pretty good results with the big providers; they're proving they can save data in a reliable fashion."

Security-wise, Ruth recommends companies look at what they're doing on-premises. "There are a lot of businesses that probably have no idea how to properly institute a secure environment and are exposed and don't even know it," he says. "These big cloud storage vendors live and die by providing good cloud security. Your own business probably doesn't have as good of security as the cloud provider."

✔ Get Your Value's Worth

Among larger vendors of cloud storage services, security protocols, total data copies kept, data center locations, and other basics are becoming more equalized, Ruth says. Now, the key differentiator is becoming the value-added services offered. Examples include providing database services and storage services at different price points, as well as partnerships the provider has. Many smaller businesses, he says, prefer obtaining a turnkey solution vs. piecing together necessary parts. "That's a very big positive, particularly for smaller IT organizations that simply just don't have the skills and the bandwidth to figure it all out."

✔ Have An Exit Plan

Ruth says because there's the potential to move a lot of data to the cloud, take care to select a provider as it has the potential to become a partner for a long time due to the difficulty of moving data out.

But because things don't always work out with providers, "you need to have an exit plan" in case you must move data out, Ruth says. "Some service suppliers will let you load up physical equipment and FedEx it to you. Some won't. Some will charge for it. Some won't," Ruth says. "You'd have to build your infrastructure back onsite. How would you do that? Where would the money come from? Do you have a budget to do that? All of that needs to be considered." P

✔ Check Out The Private Cloud

There are two growing trends in cloud storage, says Trenton Baker, vice president of development at DataON Storage (877/512-0432; www.dataonstorage.com). One is providers offering private cloud solutions; the other is companies offering transparent and competitive pricing that competes aggressively with some public cloud providers.

"Certain technical advantages exist with a private cloud infrastructure when compared to public and shared cloud," he says. "Private cloud offerings tend to be based on physical CPU cores, not virtual CPUs that typically run 0.75GHz to over 1GHz slower." Another advantage is disk I/O performance, Baker says, as a private cloud consisting of scalable and dedicated hardware means you don't have to share resources with thousands of other users.

✔ Consider The Economics

When "you start to move capabilities into the cloud, what's really happening is your economic model is becoming more flexible and you have the ability to decide whether you're going to be CAPEX-heavy or operating expense-heavy and be able to balance those things," says Gene Ruth, research director for storage at Gartner. When making decisions about the cloud, he says, involve the CFO to provide guidance whether it's more important to spend capital, spend OPEX, or "have the flexibility to fiddle back and forth."

After moving data to the cloud, conversations generally move toward, "'Well, our data is in the cloud, why don't we move our compute into the cloud?'," Ruth says. He suggests developing a complete cloud strategy looking three to five years out. Not thinking ahead could result in ending up "with a poor provider that doesn't provide the added service values you want."

BONUS TIPS:

✔ Pick Your Partner

Failure and at least some downtime are almost always inevitable, says Trenton Baker, vice president of development at DataON Storage (877/512-0432; www.dataonstorage.com). But do your due diligence, he says, and ask potential public or private cloud providers for references and to show and explain their uptime policies, when the last downtime was, and their plans for routine maintenance practices.

✔ Be Aware Of Pricing

Some public cloud offerings include pricing based on numerous complex criteria—number of instances, types of instances, instances per hour, and overall storage space consumed—that can be difficult to estimate, Baker says. "Private clouds tend to be more direct with the pricing model and are derived on pricing from three simple metrics: CPU, memory, and storage," as well as the "cost of getting to your cloud," meaning bandwidth.

HOW TO

Decommission A Data Center

Necessary Steps To Plan, Manage & Carry Out The Process

The need to decommission a data center can arise for numerous reasons, including a company merger, growth in business that necessitates moving to a new data center facility, a need to upgrade older equipment to more energy- and cost-effective equipment, or because the company is going out of business.

Whatever the reason, the decommissioning process requires and deserves considerable attention to detail before, during, and after the project is completed, if for no other reason than decommissioning can bring about a great deal of risk to a company but also a great deal of opportunity to recoup some costs if equipment is being retired. It's essential to have a solid understanding of the steps typically involved with decommissioning a data center, as well as options for retiring equipment and how bringing a third party onboard to assist with the project can prove beneficial.

Put A Plan In Motion

The successful execution of a decommissioning project relies on bringing together and involving all necessary stakeholders in developing a plan and ensuring all facets of the process are accounted for. Stakeholders generally include data center managers, systems administrators, business unit leaders, facilities, and various company heads, among others.

"Ensure as much attention as possible is given to project detail," says Keith Reger, senior project manager at Critical Power Exchange (877/630-7520; www.criticalpower.com). Doing so, he says, "is fundamental to receiving above-standard quality work."

Whether a company is going out of business or moving to a new location, Reger says, the core basics of decommissioning should include setting realistic goals and objectives. "At the onset of planning the decommissioning of a data center, be sure written, specific, measurable, and time-sensitive tasks are identified," he says. "Put a second set of eyes on plans by contacting a reputable asset-recovery or decommissioning specialist with experience."

But before seeking outside help, Reger advises assessing your company's "internal capacity for implementation" in terms of documenting the skill sets the organization can do well and areas where it's lacking. Companies should be honest in the assessments, he says, and avoid engaging in processes or procedures they don't have absolute confidence in.

Key Points

- Bring together all concerned stakeholders to develop a decommissioning plan in order to address all pertinent issues.
- Consider working with a certified, licensed third party that possesses the tools, staff, and resources to handle decommissioning.
- Before seeking a third party, perform an honest assessment of your internal resources and skill sets to handle various aspects of the decommissioning project.

"It will cost you dearly if you don't," he says. If hiring a third party proves necessary, seek one through an interview-type process that helps the company gain an understanding of what the third party's core competencies are and how it will implement them. "Very few asset-recovery, decommissioning, or relocation experts know it all," Reger says. "Other experts in rigging equipment, electrical disconnect, and physical equipment removal will share a part in executing your plans, as well."

Address The Finer Points

Paying heed to the less obvious but important details can go a long way toward helping avoid various unexpected costs that can surface during a decommissioning project. Such costs can stem from going outside of SLAs, contracts, leases, licenses, and services related to maintenance, software, hardware, equipment, and other items that are still in effect. Decommissioning can also generate costs related to having to hire electrical, telecommunication, and mechanical contractors; removing hazardous material; and acquiring trucking services, temporary manpower, and other resources not originally planned or budgeted for. Failing to hire a company licensed to handle hazardous material, for example, could result being held responsible for improper disposal.

Reger says security is another concern every company should be aware of. "At the first sign of public awareness, the site is susceptible to thievery of copper wire, high-value assets, and even the kitchen sink," he says. "Anything of value should be subject to a higher level of security at the beginning of a project." Hiring a temporary guard service or ensuring staff is onsite 24/7 to secure assets and capital equipment may be necessary. Security also pertains to data. "Any secure data or sensitive information should be removed prior to engaging any contractors or decommissioning professionals," Reger says. "Certificates of insurance, background checks of personnel to be on site, strict onsite start/finish times, and dates of work to be performed should be considered and documented prior to launch of the project."

Weigh Equipment Options

When equipment, hardware, and software are related to decommissioning, timing and preparation can be the difference between abiding by contracts, leases, and other agreements and paying hefty penalties and fines.

Hiring a third party that specializes in asset recovery, recycling, and equipment removal can help and potentially recoup some costs. Many third parties are licensed and certified in data and e-waste disposal and can supply documentation concerning destroyed, recycled, or repurposed equipment. A demolition or mechanical company, for example, might remove equipment if contracted but lack the ability to recoup costs. Reger says companies that "have a long tenure of doing this type of work should have a list of successful projects, including high-level references and project examples, including scope of work." P

Top Tips

- ✔ **Plan for growth.** Keith Reger, senior project manager at Critical Power Exchange (877/630-7520; www.criticalpower.com), says capacity and scalability are areas many companies overlook when moving to a new data center. "A high percentage of completed work of this type results in the client wishing it had planned for exponential growth due to business increases," he says. "A couple of years in the data center/technology world are seemingly a lifetime of progress to other industries. This is also a costly mistake when new or used equipment must be disposed of or be deemed unusable."
- ✔ **Go back in time.** If your decommissioning is part of a data center relocation, some experts say you should consider hiring the same company that was involved in the original data center's build. That company should be already familiar with your business, equipment, and facility. This approach can save time and money in terms of the consultation and meetings typically required.
- ✔ **Evaluating third parties.** Using a third party for decommissioning can reduce the responsibilities and stress otherwise placed on an already overwhelmed internal staff. When evaluating third parties, consider their reputation, years in operation, references, and ability to provide documentation upfront. Also consider if they'll provide the services you require or will act merely as a broker for such services.
- ✔ **Handle with care.** For liability reasons, companies should go to great lengths to ensure proper environmental procedures are followed for the disposal of hazardous materials. This includes batteries, fuels, oils, refrigerants, and other materials.

Action Plan

- Determine exactly what decommissioning means to the company.
- Bring together all pertinent stakeholders for planning.
- Set realistic objectives, timelines, and goals.
- Designate who will head up the project and assign various roles.
- Consider hiring a third party to plan, manage, and execute the project.

Get Started

When working on a decommissioning project, many companies hire a third party to help plan, manage, and execute the process. "A reputable company with a track record of completing decommissioning projects will have the tools, human capital, and the ability to anticipate unforeseen issues surrounding a project," says Keith Reger, senior project manager at Critical Power Exchange (877/630-7520; www.criticalpower.com). To reduce conflict or confrontation should they arise, Reger says that all parties involved must have a clear understanding of what the work will entail and a mutual understanding of what each individual or party is responsible for.

HOW TO

Secure Data Center Racks & Cabinets

Understand The Threats, Then Use Access Cards, Biometrics As Key Elements In Overall Plan

Randomly poll stakeholders about what they feel their enterprise's most valuable asset is, and the answer will most likely be related to data. It makes sense that data center managers go to great lengths to protect that asset.

Traditionally, one means of securing data centers has been the use of security access cards, including at the individual rack and cabinet level. But in many cases, access cards simply aren't enough anymore. The question, then, is what are the best options for securing racks and cabinets and, if necessary, what security upgrades you need to perform.

Understand The Issues

The physical security of individual data center racks and cabinets is serious business. A large number of today's data centers house data and equipment for multiple customers, which makes for some fairly high-traffic environments, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

"While most centers—especially co-location facilities—pride themselves in being extremely secure, the threat of tampering still exists when you have people coming and going so frequently," she says. Securing your equipment at the cabinet level can provide some peace of mind and will aid in protecting your equipment from physical threats, malicious or otherwise.

Viars says that, depending on the type of data being housed, physical security at the cabinet level is a requirement for compliance with certain directives such as HIPAA.

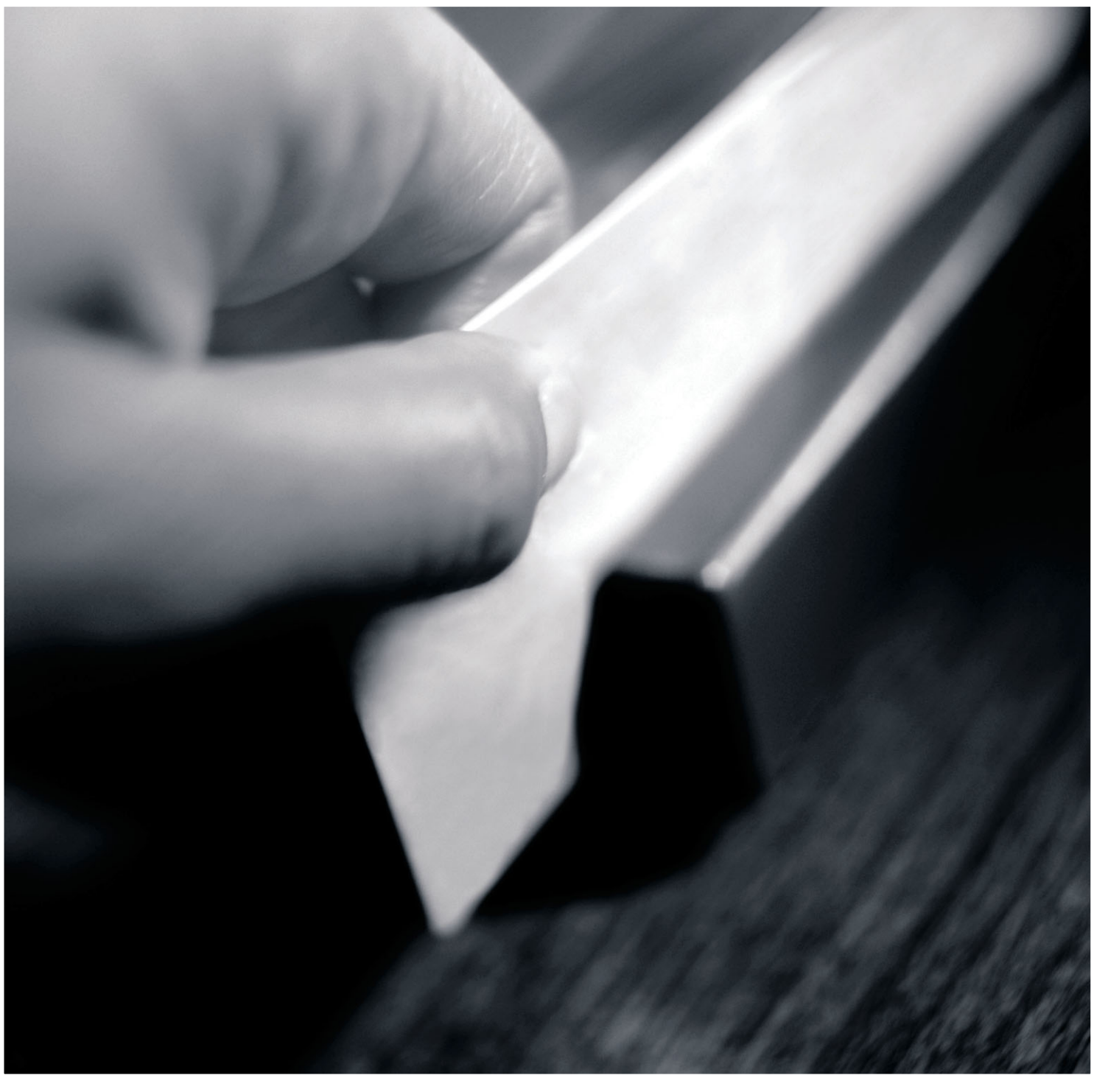
See The Big Security Picture

Info-Tech Research Group analyst Jenna Maertz says two primary issues typically prevent greater adoption of rack- and cabinet-level security. First, many server OEMs design cabinets so that it's incredibly difficult to close the cabinet's back. "The cabinets comply with width standards, but we have customers that are unable to secure the back of the cabinet because of the length being introduced by some server OEMs," she says. Enterprises, she says, "might not be able to retroactively install security at this level on existing infrastructure."

Key Points

- Many experts consider access card-based security systems as less secure than other systems, including manual key-based solutions.
- Attacks perpetrated by employees possessing access cards, or those who can obtain access cards, pose one of the biggest risks to enterprises.
- Security systems based on biometrics are a viable alternative to access cards. Costs of solutions have come down considerably in recent years.

Second, Maertz says, many enterprises view data center security from a top-down,



entire-footprint perspective as opposed to securing individual pieces. The mentality, she says, is "why secure each part individually when you could secure the whole?"

You can't ignore the threat from employees inside your organization, as they are the source of many malicious attacks on data centers, experts say. Maertz says Info-Tech advises its customers to review employee access rights as often as possible but at least annually. Here, though, access cards show one potential weakness as there's the possibility of approved employees bringing guests into secure locations, which is a "huge security breach," Maertz says.

Equip Yourself

Jeff Clark, president and general manager of Lindy USA (888/865-4639; www.lindy-usa.com), says "real" data center security consists of multiple layers and starts by defining who has access to the server room. To begin with, make sure there is a locking mechanism at the door, he says, whether it's a key-coded system, badge scanner, fingerprint recognition system, iris scanner, or other device. "Much of this is dictated by budget," he says.

Clark notes that rack-mountable cameras are also available. Once a server cabinet is opened, the camera snaps network-distributable shots to identify who is inside the cabinet. Additionally, most server room-level KVM switches provide additional security via the OSD system, which prevents keyboard/mouse access without a password.

Biometrics is considered the best alternative for securing mission-critical facilities, with some biometric solutions proving less expensive to purchase and operate than card-based systems. And their functionality is quite comprehensive, Viars says. "In the same way that smart PDUs and UPSes can help data center operators stay alert regarding the status of their equipment, biometric access control can be used in conjunction with remote physical monitors to provide all-encompassing analysis of the data center environment," she says.

Viars says a biometrics system can incorporate motion sensors to alert the operator of any presence within the data center, and door alarms can be set to message you when someone has accessed the cabinet. "These systems have the capability to log when a cabinet was accessed and for how long, and since they detect not only physical threats but environmental ones as well (humidity, heat, CO/gas, etc.), they are an ideal solution to providing all-around security in your data center," she says.

Maertz points out that many newer access cards can be programmed to include biometrics. "The employee swipes her card and then places her hand on a biometric reader," she says. "This helps ensure that they didn't just pass off the access card to another employee." Biometrics technology, she says, is becoming more commonplace, and some options, such as fingerprint readers, can be installed fairly inexpensively. P

Top Tips

✔ **Complexity not needed.** "Physical security for data center racks and cabinets doesn't necessarily have to be complex to be effective," says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). Most cabinets come with locks or have the provisions for them; make sure both the front and rear doors and any other potential access points such as side panels can be locked. Depending on your budget and desired degree of security, Viars says, standard key locks, combination locks, or biometric locks can be used. Open-style racks can be stored in locked cages, she says.

✔ **Guard USB ports.** Jeff Clark, president and general manager of Lindy USA (888/865-4639; www.lindy-usa.com), says that in addition to racks and cabinets, data center managers need to consider guarding USB ports in an effort to protect enterprise data. USB port blockers can prevent unauthorized access. "Keep in mind that your network is protected from the outside by your firewall. With a thumb drive, a person can easily introduce unwelcome software applications into a network through the USB port," he says. "Not only that, they can retrieve and save sensitive data such as credit card numbers, classified documents, etc."

✔ **Make certain that upgrades make sense.** Info-Tech Research Group analyst Jenna Maertz advises small to midsized enterprises to take caution before investing money and effort into upgrading rack/cabinet security, as "there may be use cases in which this is appropriate and sufficient," but for some enterprises, it may make sense to focus attention on securing the entire data center.

Action Plan

- Determine if security is needed more at the rack/cabinet-level or entire data center.
- If an upgrade is necessary, determine your budget.
- Know what your regulatory and compliance requirements are and ensure the potential solution meets them.
- Ensure you can centrally manage cabinet access in real-time, produce and communicate alerts, and generate audit trails related to cabinet access.
- Determine which type of rack/cabinet security solution best suits your data center.
- Compare the solutions' initial and ongoing costs.

Get Started

As a data center operator, you'll want to first identify the level of security you already have in place, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Do you allow clients and/or technicians to roam the center freely? Do you store equipment for multiple clients in shared spaces, or do technicians have access to equipment that they do not require access to?" If there's a possibility individuals could gain access to equipment that they shouldn't, consider securing individual racks and cabinets, Viars says.

SIX QUICK TIPS

Money-Saving Strategies For Building A Better Network

Lower Costs Through Better Performance, Efficiency & New Technologies

Whether you're focusing on network hardware upgrades or want to put more advanced software solutions in place, the costs can start to add up if you don't pay close attention.

But it takes more than a quick network analysis to determine your capacity needs and what pieces of infrastructure need upgrading, and it won't help your IT budget to simply throw money at the problem. You have to get better visibility into your network, look at all of your available options, and choose solutions that will deliver the network performance your company requires.

✔ Invest In Network Management

If you don't already have a network management system in place, that's often the best place to get started with upgrading your network while also keeping overall cost and budget in mind.

"You have to know your network, the demands of your network, and have visibility into the applications and protocols that are running on your network," says Mark Tauschek, lead research analyst at Info-Tech Research Group. Although it's an additional cost upfront, which Tauschek admits seems "counterintuitive to saving money," a network management system is absolutely essential to determining exactly how much more capacity you need, if you need any at all.

"In the data center, what that might look like today is, 'Do I really need 10G, 40G, or 100G Ethernet?'," Tauschek says. "10G is probably becoming more cost-effective in the data center, but there are a lot of people who are looking at 40G and 100G now, which are still quite expensive. So you go out and buy a big-iron switch. But if you can look at your demands today, get some historical data, and forecast out what you think this is going to look like in four or five years, then you're less likely to overspend."

✔ Network Virtualization, SDN & More

A few interesting new technologies can help improve your network while also saving on capital and operating expenses. Two examples of networking approaches are software-defined networking (SDN) and network virtualization. Both of these provide much more flexibility to networks and move the control layer from the access layer in order to have better control over your entire network. You can make changes and enforce new policies from a central location, rather than going to each individual access point.

These are all great features, but the money-saving aspect comes through in terms of network visibility, similar to a network management system. Using an abstracted control plane, you can see how every application or piece of equipment is affecting the network and pinpoint specific issues. Instead of guessing where you think the problems might be based solely on employee complaints or other general findings, you can dig down deeper and

solve the real problem. This not only saves money in terms of not unnecessarily adding more capacity, but it also will save money by letting you more efficiently use your IT employees' time.

✔ Consider Alternatives To A Major Overhaul

If your data center uses a wide-area network to connect multiple remote offices to one another for better communication and collaboration, then you know how expensive it can be to add more bandwidth. Tauschek uses the example of a company with offices in New York and Los Angeles. Both of them are complaining about the connection being slow, so you decide to "throw more bandwidth at the problem, and it's going to cost us $3,000 a month instead of $1,500 a month for that connection," he says. You're essentially doubling your initial investment to grow your capacity, but what happens if the same issues remain?

This is where WAN optimization comes in. "If you make a capital investment in WAN optimization between your locations, it does a lot of things to reduce bandwidth and to speed up your connection significantly," Tauschek says. "I'm going to spend $10,000 on a couple of WAN optimization controllers, as opposed to paying $1,500 a month, and my payback is in seven months." The short-term benefits, let alone the long-term ones, are significant. But if you go even further and couple your WAN optimization solution with a quality of service solution, you can prioritize real-time traffic such as videoconferencing or VoIP to get the best possible speeds and reliability for mission-critical applications, Tauschek says.

✔ Supplement Your Internet With Inexpensive Broadband

Don't get caught up in the assumption that you need to have all of your networking capacity inside the data center or, in some situations, hosted in a colocation facility. If you don't regularly upgrade your components and spend money on new infrastructure, then you may not be reaching your network performance potential.

Tauschek points out that many companies still have T1 networks or bonded T1 networks that simply aren't enough to keep up with the aggressive needs of recently released applications. Consider using inexpensive broadband from service providers to "replace the more expensive, private, or nailed-up connection," he says.

"For instance, I can get a business-class cable connection that's going to give me 20Mb down and 20Mb up for $150," Tauschek says. "My T1 that gives me 1.5 down and 1.5 up is still $400. If I do that, then I can get a DSL, put them both in a multi-WAN router, do some link-balancing and load-balancing, and get five times or more of the bandwidth for half the price. On the WAN side and the Internet service side, that's really where probably the bigger money savings can come from." P

✔ Take A Broad Perspective

Instead of putting a singular focus on network-based cost-cutting or any other individual aspect of the data center, companies need to take a more holistic view, says Brad Casemore, research director, data center networks at IDC.

"I have to consider racks, compute capacity, storage, network, management, and to what extent I'm going to implement virtualization. It's all about taking that broader perspective on what you want, where you can wring savings from your data center, and how all of the pieces fit together," he says. If you cut costs across the board and optimize your data center's overall performance, those savings can in turn help improve your network or any other piece of infrastructure.

✔ Know What Costs To Expect

You can save money throughout the network upgrade process if you know in advance what pieces of your network you plan to upgrade. If you are looking to upgrade your actual physical network hardware, then you will spend money on switches, routers, and other important components. But if you already have a solid foundation in place, there are plenty of other costs to consider, such as WAN optimization, application delivery controllers, firewalls, unified threat management systems, and much more.

Mark Tauschek, lead research analyst at Info-Tech Research Group, says that in addition to hardware and infrastructure costs, there are also skills-related costs to consider, such as the "costs for network architects, network administrators, and other people you need to build and manage your network." But you also have to take every potential cost into account, or you may end up spending too much money for unnecessary features and capacity.

BONUS TIPS:

✔ Look For Future Commoditization

Brad Casemore, research director, data center networks at IDC, says he doesn't see a near-term commoditization of network hardware similar to what has happened in the server space. But he does have hope that in the longer term, "we'll begin to play out the value chain from merchant to switch vendors to OEMs and so forth, so you'll be able to certainly save on hardware." In essence, you should do everything you can now to save money, but know that lower hardware prices are coming in the future.

✔ Watch Your OPEX & CAPEX

"Make sure investments you're making in technology will give you a road to lower OPEX and CAPEX," Casemore says. "It's all about keeping up with this stuff, which is easier said than done." But, he says, if you stay engaged and follow what's happening in virtualization, modular data center technologies, and the best practices of management, "I think you can begin to realize some meaningful gains over time."

SIX QUICK TIPS

Cut Down On Data Center Noise

Assess Your Environment By Looking At Servers, Fans & Other Culprits

Data centers are full of equipment that often requires large amounts of power and has many moving parts. Because of that, there can be a variety of sounds mixing together to create ambient noise in the data center as well as in surrounding office spaces.

Just how big of a problem is noise in the average data center? "Excessive noise can result in a stressful work environment affecting concentration and producing fatigue," says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). "Most data centers register in the 70 to 80 dB range, a level where normal conversations and phone calls are difficult if not impossible have." Koty notes that, while that noise level is safe by OSHA standards, at 80dB, productivity and comfort can be at risk.

There are many ways to cut down on data center noise, but to get started, you need to find the source and correctly solve the problem.

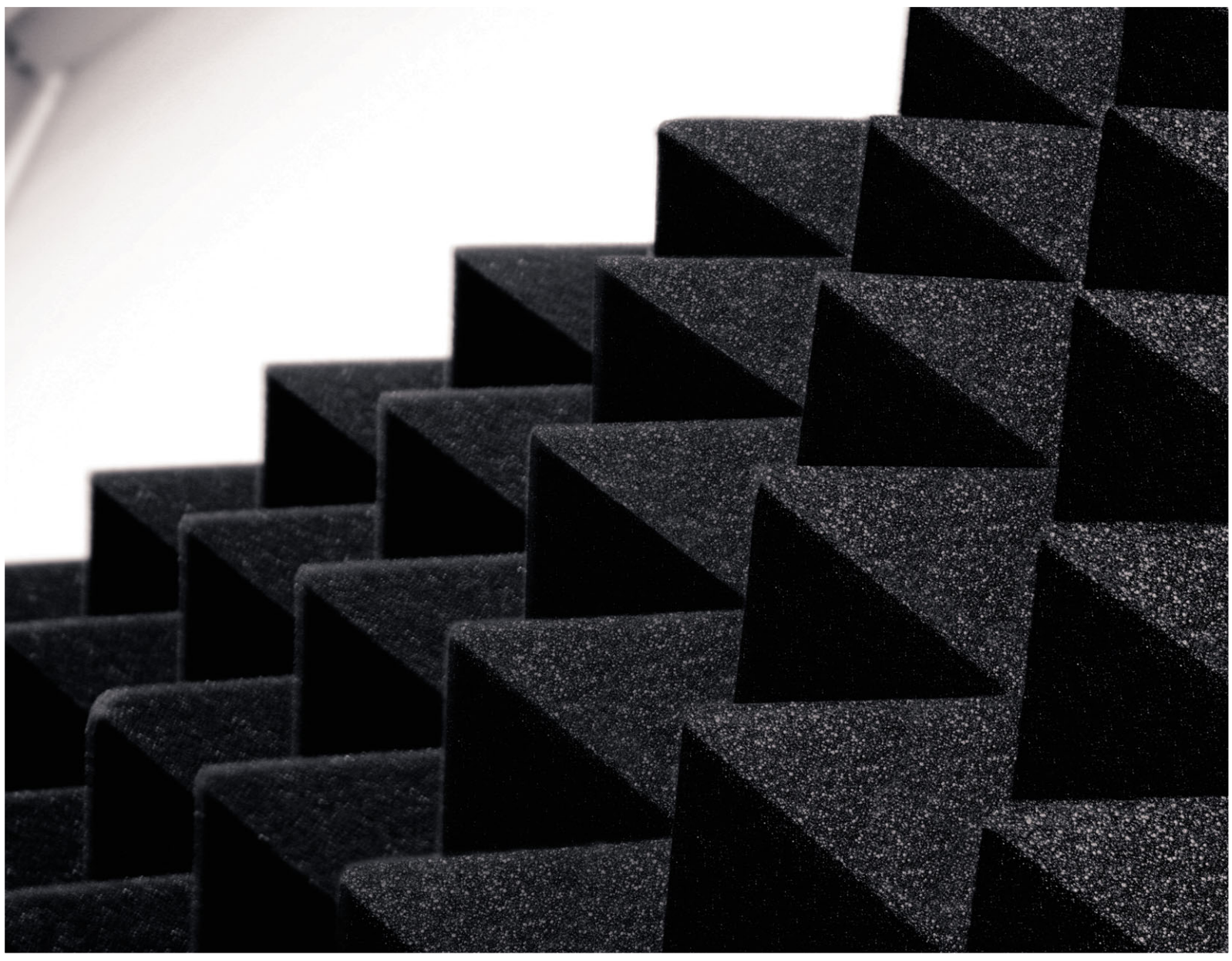
✔ Perform A Walkthrough & Research Solutions

A data center environment assessment team will point the most likely issues related to excessive noise, but there are other ways to hone in on the biggest offenders. "Investigate where the noise comes from, other than the obvious servers," says Deborah Petty, president of Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Walk around with several people, holding a normal conversation, and see where they begin to not hear you or have difficulty understanding clearly." After the walkthrough, you can make a list of the most troublesome areas that need to be addressed.

But before you come up with your own solutions to the noise issues or invest in a sound-dampening solution that may not be necessary, Petty recommends contacting the equipment dealer or manufacturer to see if it has any suggestions or quick fixes. "Call your dealer first and ask if the manufacturer of the equipment has something to address the noise," Petty says. "If you don't get fast data back, call the manufacturer yourself. They may have an obscure part or product that will make a big difference. Plus, when manufacturers hear directly from the end user, they pay closer attention to problems or can get creative to help fix something that may be reasonably unique to your setup."

✔ Install Closed Or Sound-Dampening Cabinets

More often than not, you'll find that the noise issues in your data center are being caused by servers and other components housed inside racks and cabinets. After all, these pieces of equipment are the workhorses of the enterprise and have the most



moving parts that could be causing noise. One option is to put that equipment in a new enclosure that will help cut down on noise and provide other benefits.

Koty recommends moving noisier servers from open racks to closed cabinets. “Consider investing in fully enclosed cabinets or cabinets that offer noise abatement capabilities, including acoustic baffles and doors,” he says.

Petty agrees, adding, “Sound-dampening cabinets do a terrific job of bringing the decibel level down, and several models also provide up to 7kW of heat dissipation, which is outstanding. The sound attenuation can be truly remarkable with very satisfactory results, and housing loud equipment is easy in a rack dedicated to reducing sound.”

✔ Is Cooling Is The Culprit?

Cooling systems are another large contributor to data center noise. They are critical to ensure your equipment operates at the optimal temperature but, depending on how many fans you have in your racks, they could be humming loud enough to annoy nearby employees. Petty recommends replacing your existing fans with quiet fans, which are designed cool efficiently with little aural interference.

Koty suggests going a step further and limiting localized floor fans as each additional fan in the data center adds noise, and the use of localized floor fans adds localized noise. “Make the best use of CRAH units. Though louder, CRAH fan sounds are kept to the perimeter of the data center,” he says.

✔ Other Investments Worth Considering

In addition to cabinets and cooling, Koty offers a couple of other investments that may make sense for your environment:

Replace noisier equipment. If you have older equipment that is showing signs of wear, replace it with newer, quieter equipment. Over time, Koty says, the fans in an older piece of equipment will show signs of wear by the noise they make; screeches and whines are signs of age and wear. Noisy fans can also be an early sign of potential equipment failure, he says. During upgrade, consider replacing the noisiest equipment first.

Invest in hot aisle/cold aisle containment. You can contain server fan noise by enclosing the sever within an aisle containment system, Koty says. The containment barriers will catch the sounds and prevent them from reverberating around the rest of the data center. Within the containment area, though, fan noise will be even greater, he says, so you’ll want to consider ear protection if you anticipate prolonged exposure. P

✔ Consider Sound-Proofing

Usually walls and insulation are enough to block out noise from the room, but if you want a library-quiet office space, sound-proofing is an option.

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says if you don’t have a drop ceiling, consider installing one with acoustic tiles. “Some of these sound-deadening panels, tiles, and baffles can be suspended or hung from the ceiling and walls to prevent the sound waves from reflecting off of ceilings and walls back into the data center. Make sure they are fiber-free, properly fire-rated, and designed to reduce reverberation and prevent noise build-up.”

✔ Listen To Your Employees

The easiest way to figure out whether the noise in your data center is a problem is to speak with your workforce. It would take uncharacteristically loud equipment to cause issues related to reverberation, but it doesn’t take much more than a persistent buzz or beep to throw an employee off his game.

“It’s only a problem if it’s a problem for your staff or customers,” says Deborah Petty, president of Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). “If you’re getting comments or complaints, you have a problem. Excessive noise can break concentration, prevent employees from communicating easily, and cause some staff members to develop low-level headaches.”

BONUS TIPS:

✔ Watch For Equipment That Runs Quiet

Deborah Petty, president of Rackmount Solutions (866/207-6631; www.rackmountsolutions.net), says that although she hasn’t necessarily heard that equipment is getting quieter by design, she believes it might be on its way soon as manufacturers fine-tune their products. “Anyone who can tout ‘reduces noise substantially’ has a real selling point over a competitor, assuming functionality is similar,” she says.

✔ Take A Look At Your Floor Panels

If you’ve taken extensive efforts to reduce the data center noise and still aren’t content, take a look at your floor panels. Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says for a quieter data center, consider using steel-encased wood-core floor panels, which can provide both high strength and good fire and acoustic performance.

SIX QUICK TIPS

Choose The Best Servers For Virtualization & Consolidation

Compare Capacity, Memory, Network Connectivity & More

By virtualizing applications and efficiently using available server resources, you can cut down on the physical equipment you need, saving space and money. But you can't implement virtualization and benefit from consolidation if you don't have the right servers for the job. We'll show you some of the most important features to look for and help you get the best performance for your money.

✔ Choose Memory & Networking

As x86 servers, which are good fits for virtualization, start to approach the commodity level, it makes sense to focus on more than just the processor. John Sloan, lead analyst at Info-Tech Research Group, says the processor type is "not going to be a differentiator from one brand of server to the next." Instead, he says, consider where the potential bottlenecks would be if you implemented virtualization and use those predictions to pinpoint important features.

Memory can limit the number of virtual machines (VMs) a server can support even more than a processor. "When you start to crowd in a lot of VMs, especially with the latest generation, you're not liable to hit the ceiling in terms of concurrent VMs running on a single processor," Sloan says. "But where you might hit a bottleneck or a ceiling will be in memory and how many VMs can concurrently run and share that memory."

Sloan says it's also important to consider the server's networking capabilities, particularly for data centers that separate their servers from their storage arrays and connect them via a network such as a SAN. A lot of companies still have 1GbE switches that "can top out the amount of capacity to those arrays," Sloan says. If you don't have at least 10GbE or your network connectors and bandwidth aren't up to par, he says, it will affect your ability to run most consolidated infrastructures.

Some vendors are "almost reinventing the server," Sloan says. Instead of only putting memory, a processor, and some networking capabilities in the servers and then connecting them to separate storage, vendors are building high-capacity, fast storage solutions into their servers, which can, in some cases, cut SAN out of the picture. "If you consider that processors are getting to the point where they can run a lot of different workloads and a storage controller, you can essentially have everything together in one box," Sloan says.

✔ Make Sure The Servers Fit Your Requirements

A lot of what you look for in a server will depend on the type of virtualization software you want to use. Make sure your vendor's servers support your chosen software. From there, a vendor should be able to show you the key features you'll need to get the most out of virtualization and help you consolidate through improved performance and efficiency.

"Since the purpose of virtualization is to get more productivity out of a single server while reducing administrative overhead, companies generally want to find a high-performance, multiprocessor system with

large amounts of memory, hard disk space, and network bandwidth to meet their requirements," according to Supermicro (408/503-8000; www.supermicro.com). Depending on your applications, you should also consider the redundancy options, including level of RAID for storage protection, redundant power supplies, and multiple network interfaces for load balancing and redundancy.

✔ Match Servers, Applications

You need to find a server that can fully support your applications. "If the company is going to run mission-critical applications, then the server will need to be configured with as many redundant components and features as possible for maximum availability," according to Supermicro. "If the availability of the VMs is provided via software management across multiple physical servers, then the reliability requirements for individual servers are different." This is especially important because the reliability of servers, down to the guaranteed 9's of availability, will affect the price.

Sloan says to be careful about vendors that focus too heavily on consolidation ratio, which is the maximum number of VMs a server can handle. This can be particularly misleading because some applications require fewer VM instances than others, which could lead to paying for features you don't need.

Know what resources each virtualized application will require. "The latest generation processors and the capacity you can get with two processors may be more than enough for your consolidation needs and may be more than enough to run even high-end VM requirements," he says. "It's about cost per capacity, as well as raw capacity."

✔ Refresh, Rather Than Retrofit

You can retrofit servers for virtualization, Supermicro says, but it depends on their age. If you have one- or two-year-old servers, you can upgrade internal components such as processors, memory, hard drives, and PCI-E flash memory cards or even replace server nodes with more advanced ones to build a better multinode system, according to Supermicro.

But just because you can retrofit existing servers doesn't mean you should. Sloan says companies used to see virtualization as "investment protection and a way to extend a server's useful life." However, if the servers are too old, it could erase the potential gains. "Virtualization tends to go to the lowest common denominator," Sloan says. "If you have a bunch of machines, it will virtualize to the lowest processor." This could mean that you are getting the same low utilization rates and not taking full advantage of available capacity.

Today's x86 servers "are commodity and have a set lifecycle, so usually it's more about planning for your refresh than finding ways to upgrade," Sloan says. He uses desktop PCs as an example of where servers are today. "In the early days, you could add a new hard drive or upgrade your memory. But what happened is you eventually realized that you could spend all of your time and effort doing that, or you could just wait another year and get a new PC that had twice the capacity." P

✔ Look For Integrated Virtualization Management

Virtualization is great technology to take advantage of, but only if you have a way to monitor and manage the underlying software. "If, for example, you have a blade system, you want to look at how the virtual infrastructure is managed," says John Sloan, lead analyst at Info-Tech Research Group. "You also want to look at how that management of the virtual layer integrates with management tools for the overall infrastructure. In a virtualized and consolidated world, hardware is capacity and you just want to make sure you get the best capacity and best utilization for the dollar."

✔ Reduce Your Physical, Power Footprints

One of the biggest benefits of consolidation is the ability to lower the physical footprint of your data center by minimizing the number of servers you need. But there are some other ancillary benefits of consolidation that you may not think about initially, such as lowering your power consumption.

"When we're evaluating blade systems, we do look at power efficiency ratings and things like that," says John Sloan, lead analyst at Info-Tech Research Group "The original blades were reducing the physical footprint, but they tended to suck a lot of power and generate a lot of heat, so maybe you could avoid having to expand your data center or get a new data center and there were savings there, but you were still paying a lot for facilities. You can now look at power consumption and energy efficiency ratings, because some of the newer-generation gear is cutting down that consumption curve."

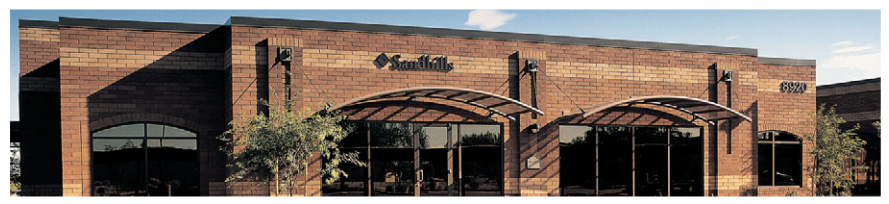
BONUS TIPS:

✔ Look For Certifications

When looking for servers for virtualization and consolidation, Supermicro (408/503-8000; www.supermicro.com) recommends choosing a multiprocessor system that has been certified compatible with the intended virtualization software. You also need to select certified components that support virtualization with drivers readily available. If a server or component is certified for virtualization, then you know you'll get the best possible performance for your specific environment.

✔ Maximize Efficiency For Better ROI

The point of virtualization and consolidation is to make your data center more efficient and help you save money. The best way to do that, according to Supermicro, is to maximize the capacity of the processing cores, memory, storage, and networking bandwidth and optimize the resource allocation for better total cost of ownership.



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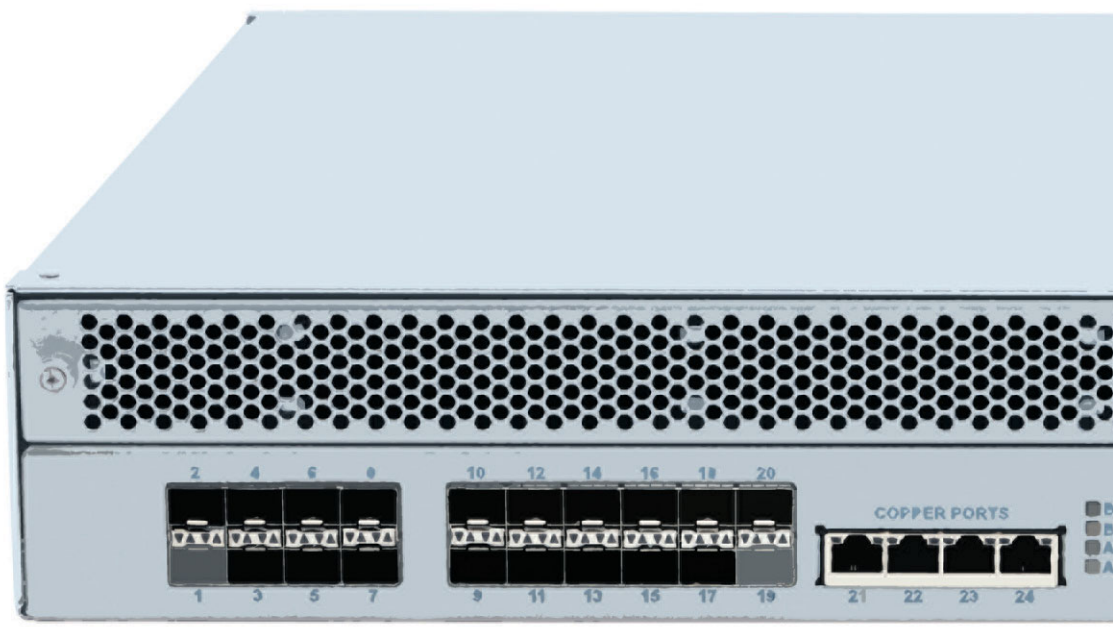


BUYING TIPS:

Networking Equipment

THE HEALTH of a company's network is crucial to its productivity. As such, choosing the right equipment to run your enterprise network can't be taken lightly.

As you evaluate how you're going to manage your unique network and improve metrics overall, here's what to watch for.

✔ Seek Advice

The road leading up to actually buying next-generation network gear should be filled with staying current on standards, protocols, and vendors' proprietary features. Doing so, says Rob Enderle, principal analyst for Enderle Group, can save time in narrowing down vendors and exactly what equipment is available that can meet specific needs. "Like a fine wine, you don't implement a standard before it's time, but you don't want to be excessively late, either," Enderle says. "Otherwise, you'll likely pay a premium for aging technology. Stay informed."

✔ Look For Cost-Effective Upgrades

It's important for small to midsized enterprises to look for ways to upgrade networking equipment cost-effectively. Eric Hanselman, research director, networks at 451 Research, says a first step is assessing the performance of the various components of the network.

Surveying network performance can pinpoint whether core, edge, or access are areas that need attention. Wireless performance can be more complex to accurately assess, Hanselman says. Because the radio frequency performance varies with physical building constraints and the wireless devices involved, companies may need to enlist expert help. "Simply adding more access points can often make a bad situation worse," he says.

Alan Weckel, Dell'Oro Group senior director of data center appliance, enterprise telephony, and Ethernet switch market research, says that reducing spare capacity is the biggest way to cut costs.

✔ Go To The Core

Core network upgrades can add capacity that elements at the network edge can leverage, Hanselman says. "This is a good investment if there is congestion in the core, and this is often the case," he says. "If access performance is a bottleneck, either for devices or for traffic headed to the Internet or wide area network, a core upgrade won't make a noticeable difference."

One possibility for cutting costs when upgrading core networking gear is acquiring used or refurbished components. Hanselman says such gear can offer reasonable value, "as long as it's still actively supported by the manufacturer." Support, he says, must include the firmware and OS.

"For some manufacturers, equipment components can be upgraded without replacing a whole chassis," he says. "Control or supervisory module upgrades may be available in both new and refurbished equipment." Weckel sees this approach more as an option for smaller enterprises, "as a switch from a Fortune 50 company that is three years old is still probably feature-rich for what an SMB may need."

✔ Bargain For Better Prices

Vendors are often willing to get aggressive with pricing, especially if they know competitors are in the picture. Pin your list down to two or three vendors that you'll be happy with and then start bargaining.

Where the ideal time to buy is concerned, Enderle says it's helpful to have someone you trust who is active in the standards efforts in on the decision "so they can tell you of the pitfalls and help you with timing," he says. "This ensures you neither buy early nor late."

✔ Take Your Time

Spending the time necessary to implement a network refresh correctly can result in time and money savings later. "Much of the cost connected to any technology change is the result of mistakes that result in the firm buying what they don't yet and may never need and in undoing bad decisions," Enderle says. P

BUYERS' CHECKLIST

- ✔ Is the product designed for the needs of a small to medium-sized enterprise?
- ✔ Is purchasing used equipment an option?
- ✔ Are we up to date with current standards and protocols?
- ✔ Is this upgrade something we will take advantage of now or in the near future?

KEY TERMS

Gigabit Ethernet (GbE)
Technology for transferring information at the rate of 1 billion bits per second. Other high-speed standards include 10GbE, 40GbE, and 100GbE.

IPv6
A communications protocol designed to replace IPv4 and prevent the problem of running out of potential IP addresses. IPv6 uses 128-bit addressing, compared to IPv4, which uses 32-bit addressing.

Buying Tips:

Data Center Cooling

Data center cooling is as vital a concern as storage capacity and security: Data centers run more efficiently and reliably with the proper temperature, and uptime is everything. Having the right equipment is essential.

✔ Plan, Plan, Plan

"Probably the most frequent mistake made by owners purchasing equipment is not knowing the load. In some cases they overestimate the load, requiring too much cooling equipment, which causes cost and operational problems. On the other side of the spectrum, underestimating load results in hot spots or worse," says John W. Martin, marketing manager at Data Aire (800/347-2473; www.dataaire.com), Get a qualified mechanical engineer with data center experience involved early in the process to ensure you get the size and type of equipment to meet your requirements, he says.

David Manke, who specializes in cooling equipment sales at Critical Power Exchange (877/630-7520; www.criticalpower.com), says you need to plan in advance. "Poor planning can, at the minimum, result in unforeseen expenses and lost productivity. Worst-case scenarios can include equipment failure, downtime, and breach of contract with customers," he says.

Manke says you need to answer several questions: How much cooling (BTUs) is required for equipment to remain at the required temperature? Does your site require a closed- or open-loop system? Where will the cooling equipment be located? Is noise a concern?

Also make sure you know and understand all the options available. The right solution will incorporate the amount of heat the equipment generates, logistical limitations of the site, the power efficiency, the ambient temperature in your location, and more.

✔ Decide Between Portable & Permanent

Weigh the pros and cons of portable and permanent air conditioning systems, says Clark Michel, vice president of Atlas Sales & Rentals (800/972-6600; www.atlassales.com). "The installed cost of a portable cooler can be dramatically lower," he says, as a permanent system often entails at least some construction and installation costs. Plus, maintenance is also simpler with portable systems.

When purchasing a portable unit, Michel says, be sure to use a high-quality commercial-grade portable air conditioner and consult with your equipment supplier to make sure you get a unit that will handle the total heat load. "It is actually not a bad idea to oversize portable equipment slightly."

✔ Decide Between Open Or Closed Loop

Open-loop cooling systems utilize a liquid coolant that is exposed to air and the environment. They tend to have a lower initial cost but also require more frequent maintenance and water treatment and aren't as efficient as closed-loop systems. A closed-loop system uses an air- and environment-isolated liquid coolant. Closed-loop systems tend to have a higher initial cost but require less maintenance and provide better cooling efficiency.

✔ Don't Forget About Airflow

"A great deal of money is thrown away on cold air that just doesn't reach the equipment," says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Data Aire's Martin agrees, adding, "The most important issue in data center cooling is airflow management, starting with hot aisle/cold aisle, blanking panels, and sufficient room under the floor to allow for air distribution." If you can add filler panels and other add-ons to your cabinets and racks, then you can direct cool air to where it's needed. This is a relatively inexpensive solution to cooling issues, and it could result in long-term savings. P

Buyers' Checklist

- ✔ How many BTUs do you need to keep your equipment at the appropriate temperature?
- ✔ Do you really need the additional cooling equipment?
- ✔ Do you need a closed- or open-loop system?
- ✔ Where will the cooling equipment be located?
- ✔ How much of a concern is noise output?

Key Terms

British Thermal Units (BTUs)
Used to measure the amount of energy required to heat a liquid such as water. A single BTU represents enough energy to raise the temperature of one pound of water by one degree Fahrenheit at a constant pressure of one atmosphere. In the context of cooling equipment, BTUs are listed as a given rating per hour.

cooling capacity factor (CCF)
The ratio of total installed nameplate capacity to critical load. This ratio should be about 1.2, or 120%.

power usage effectiveness (PUE)
A technique used to help enterprises measure how much of their total data center energy usage is going toward IT and computing equipment.

Buying Tips:

Fire Protection

In an instant, a data center fire can devastate a business. Beyond downtime, there's equipment damage, escalating insurance rates, and other related costs—hence the need for fire protection and suppression systems. Here's what you need to know when selecting a fire protection system for your data center.

✔ Understand The Basics

Chris Jelenewicz, P.E., engineering program manager at the Society of Fire Protection Engineers, says there are several factors to consider when installing fire protection systems, including the building's structure, occupants, first responders, and equipment. Jelenewicz says both active fire systems (sprinkler, gaseous, alarm and communications, smoke management, etc.) and passive fire systems (fire doors, walls, etc.) are necessary to protect people, property, and structures. Both system types "should be designed so that they work together as one complete fire protection system."

Melanie Davy, analyst at Info-Tech Research Group, says at a minimum, a data center must have a sprinkler system, fire detection and alarm components, portable fire extinguishers, and emergency power-off abilities (according to NFPA 75). Other forms of protection, such as clean-agent suppression systems, are classified as add-ons.

✔ Decide Between Water & Non-Water Options

Fire protection is generally broken down into water and non-water options. The obvious downside to using a sprinkler system is that electronic devices and water can be a bad combination, especially in situations that are started by electrical fires. Thus, most data centers opt to go with a clean agent or aerosol agent suppression system, which is designed to leave no residue and is safe for both electronics and people, unlike some chemical-based fire protection.

✔ Know Your Alert Choices

You'll need to know at what stage during a fire the detection system should trigger the suppressant to release. Effective detection is key, as the suppression system is only as good as the detection system initiating the release.

Invest in a smoke and fire detection system that can alert employees and IT staff to problems. Some models are capable of detecting the various stages of a fire, such as visible smoke vs. flaming fire vs. intense heat, to allow you to set off alarms or activate various stages of fire protection. P

Buyers' Checklist

- ✔ Find a smoke/fire detection system that meets your needs in terms of stages of fire protection and number of physical detection locations.
- ✔ Research the various clean agent suppression options and make sure your sprinkler system can work with the clean agent suppression system.
- ✔ Invest in an emergency power off system to shut off electricity when a fire is detected.

Key Terms

aerosol agent
A type of fire suppressant system that leaves little residue and won't damage equipment. Does not require a sealed air-tight space as the agent does not pressurize the protected area when discharged.

agent storage container
The assembly or unit that stores the clean agent fire suppression liquid until it needs to be released when prompted by the suppression control panel.

Class C
Fire breakouts that involve electrical equipment where a non-conductive extinguishing agent must be used.

clean agent
A type of fire suppression system that leaves no traces behind.

deluge
A system where all the sprinklers connected to the water piping system are open. If the deluge valve opens due to a signal, the entire area will be sprayed with water.

early warning smoke detector
A passive detector that uses ionization and photoelectric sensors.

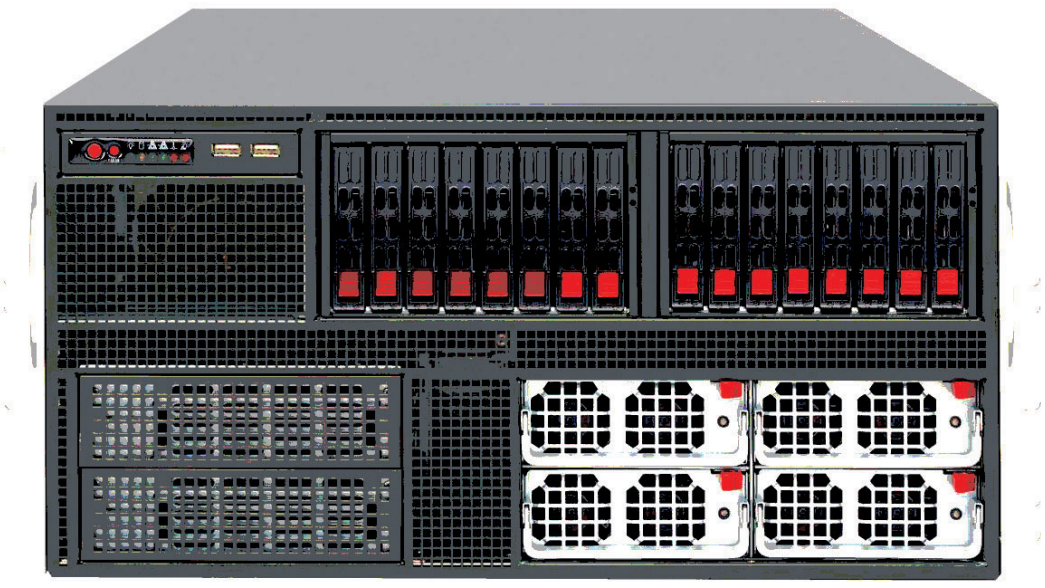
heat detector
A unit that sends a response when the convection of thermal energy changes the temperature of the device's heat-sensitive element.

suppression control panel
The unit that houses the interface you use to control the fire protection system.

very early warning smoke detector
A smoke detector that samples air particles via aspiration to find non-visible smoke.

Buying Tips:

Servers



Buying a new server takes significant prep work. Beyond pinpointing the data center's needs and how the server will meet them, there are budgetary, compatibility, and vendor considerations to address, as well. Because servers are so essential for businesses, IT managers must understand when it's time to buy new servers, and as with any IT purchase, the goal should always be to invest in a solution that will give the company the performance it needs for years to come.

✔ Determine The Features That Are Most Important

Charles King, president and principal analyst at Pund-IT, counts CPUs, memory, and I/O as the most critical server features, though their relative importance depends on the application and workload they'll support. Companies running a business-critical database or online transaction program, for example, should eye a higher-end CPU/system than what's needed for general-purpose applications. For virtualization-related use, spend more for extra memory and I/O.

Mark Bowker, Enterprise Strategy Group senior analyst, says that too often, IT purchases a server with more capacity than needed, which provides the comfort of extra headroom but also incurs additional expense. At the same time, though, you want to future-proof your investment as much as possible by looking for efficient, power-saving servers that can help lower energy costs in the short and long term.

"IT should understand what the latest processor chipset is on the market and what the stated road map of the chip manufacturers are," Bowker says. "This will help avoid buying into servers that are at the end of a product lifecycle."

Tau Leng, Ph.D., vice president and general manager of corporate marketing and HPC solutions at Supermicro (408/503-8000; www.supermicro.com), adds that today's server systems are available with a variety of processor technologies and form factors. "Customers often purchase equipment that is overdesigned with unnecessary features," he says, which is why it's essential you work with an experienced and reliable partner that can offer a variety of solutions.

In addition, Leng says, adherence to standard rack unit is important to allow for easy interchange of servers. Remote management features also are critical, and power savings is becoming an important element in TCO determinations.

✔ Watch For Trends

Leng says one relatively new trend in servers is high-temperature free-air cooled server environments, which can reduce electricity demand and rein in costs.

Virtualization and consolidation are also having an impact. John Sloan, lead analyst for virtualization and consolidation at Info-Tech Research Group, says it's important to know how a server will fit into a consolidated stack that includes servers, networks, and storage.

Unlike distributed models, Sloan says, "in a consolidated infrastructure, the server is a unit of hard capacity (processing and memory) that's combined with networks and storage in a resource pool that's partitioned up into virtual entities." Increasingly, he says, enterprises aren't buying servers, but blocks of capacity. What differentiates current offerings "is how the interconnects are managed and how the whole thing is managed as one resource pool," Sloan says. Typically, blade servers are the form factor for consolidated offerings, he says.

✔ Consider Your Budget

Before you get started with a server upgrade or replacement, be sure to carefully plan your budget. Costs associated with a server upgrade can be staggering, says Charles Jansen, technical support manager at Aberdeen LLC (800/500-9526; www.aberdeeninc.com). Possible expenditures include those related to equipment, software licensing, labor, telco and power company services, facility improvements, vendor support, and downtime. Additional costs related to supporting a new platform can include those for power, network cabling, cooling, rack space, and management personnel, he says.

Sloan says, "In any infrastructure purchase, the upfront capital acquisition cost is just part of the deal. Three- to five-year total costs should be calculated, including maintenance and facilities costs." P

Buyers' Checklist

- ✔ Match the application and workload the server will support to the CPU, memory, I/O, storage, and other components it will require.
- ✔ Recognize that virtualization, consolidation, and cloud computing are trending areas where servers are concerned.
- ✔ Ensure the vendor satisfies all questions concerning support, compatibility, performance, and other issues.

Key Terms

80 Plus
A certification program that measures power supply efficiency.

form factor
The space a server occupies. Examples include 1U, 2U, 3U, 4U, 5U, 7U, and blade.

Intelligent Platform Management Interface (IPMI)
Technology for remotely monitoring and managing servers.

Buying Tips:

Colocation Providers

Getting it right the first time is crucial when selecting a colocation provider, says Darin Stahl, Info-Tech Research Group lead analyst. "When you get into a colocation, switching costs are enormous," he says. "This isn't like buying a bunch of photocopiers, being unhappy with them, and putting them to the curb and getting new [copiers] in. It's a big deal to go through switching." To find a good fit with a colocation provider, consider the following.

✔ Understand The Options

Stahl says the colocation/managed service providers market can be categorized into three tiers. Tier one vendors typically have significant market influence and enormous geographic scale, he says. Tier two vendors generally have the same qualifications but less market influence and possibly less geographic scale. Tier three vendors are basically everyone else, he says.

Although price is a factor when comparing providers, it shouldn't be the driving factor. Smaller colocation providers that compete on price and don't own their facility typically can't offer an iron-clad SLA around the actual facility, Stahl says.

Lynda Stadtmueller, program director for cloud computing services at Frost & Sullivan's Stratecast division, agrees, adding, "There's too much at stake . . . to go low bid." Colocation, she says, "is not a commodity; every provider has different configurations, capacity, processes, and systems that can seriously impact your applications."

✔ Consider Usage & Location

Be sure to consider how you want to use the facility and for what purpose. Some companies invest in colocation so they can cut down on internal data center and infrastructure costs while others hope to set up a safe solution for disaster recovery. Once you know how you intend to use equipment in your colocation environment, you can then find the best location.

✔ Make Sure There Is Room For Growth & Expansion

Although it's important to put a heavy focus on what your company needs now in terms of equipment and performance, it's also crucial to look to your company's potential future needs and ensure there is enough room for expansion years down the road. Instead of backing yourself into a corner, make sure your colocation provider's facility is flexible enough to support more or less equipment depending on whether you wish to expand or consolidate at a later date.

✔ Know The Reputation Of Your Provider & Its Facility

Checking a colocation provider's past history is as important as making sure it's in a safe location, if not more so. Request customer referrals whenever possible and gather as much information as you can about the provider before you make your decision.

✔ Check The SLA

"Be sure to compare the SLA to the services you are planning to use," advises Brett Femrite, sales manager at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Some SLAs have varying levels of coverage based on the services that you choose. Be sure to note whether there is a redundant service offering that you must opt in to use in order to be fully covered by the SLA. Examples include A/B power or redundant network connections."

Stahl says to push for the contract to include an annual services review and ability to right-size or contract services so you don't pay for, say, server space you don't need. Some of the best vendors do this upfront, he says, while others will with a push and some not at all. Conduct a quarterly operations-style meeting with the vendor to discuss what you did in the space during that time, what worked and didn't, and what you have planned. Ask the vendor to do likewise, which may result in learning the vendor's scheduled outages. P

Buyers' Checklist

- ✔ Who owns the colocation facility?
- ✔ What are your short- and long-term plans for the facility?
- ✔ What options are in place for potential company growth and expansion?
- ✔ How much power and space do you need?
- ✔ Does the facility offer 24/7/365 customer service?

Key Terms

cabinets, cages, and suites
Terms used to describe how much space a company needs for its colocation resources. Cabinets are for companies that only need a small amount of space; suites, vaults, or rooms are required for larger-scale colocation needs.

geographic risk mitigation
The practice of selecting a colocation provider and facility based on the location of its data center. For instance, choosing a data center located in a region with a calmer climate vs. one located in a region that's prone to hurricanes, earthquakes, or other natural disasters.

Buying Tips:

UPSes

The importance of UPSes can't be overstated. If power outages occur and the data center doesn't have UPSes that can meet necessary power requirements, the result will be potentially business-crippling downtime.

✔ Learn Your Total Load & Maximum Runtime

Narrowing down what you need in UPSes can be difficult, and the number of options available can complicate matters. "You have to start with some basics and be armed with some knowledge before making a selection," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Know the minimum time UPS batteries must provide power and the maximum runtime needed. "You'll also need to know the voltage of the electrical service that will power the UPS," he says.

Most importantly, know the total load of all equipment you'll connect to the UPS, so you can make sure the unit is sized correctly for the load necessary, says Neil Matheson, director of UPS and Special Services at Critical Power Exchange (877/630-7520; www.criticalpower.com). You'll also need to make sure you have enough physical room to place the needed equipment.

✔ Look To The Future

Along with a firm understanding of the equipment you want to protect right now, you'll want to consider what equipment you might be adding over the next 24 to 36 months, Matheson says. "A safety margin of 50% for a new installation is usually the rule of thumb to allow for growth."

Also be sure to account for unexpected additions that will inevitably crop up. Doing so will ensure you avoid purchasing a UPS that meets your needs now but becomes outdated in the near future.

✔ Know The Available Features & Options

The UPS features your enterprise needs can depend greatly on the protection level required for given applications.

"Which option is best for the consumer depends really on them and their environment. Some people plug in a UPS and walk away. Some people go in the other direction and have the units serviced every four months in a fiscal year," Matheson says.

Matheson says key features to look for include external maintenance bypass; cabling cabinets, if needed, depending on the size of the UPS in kVa; and remote eye and/or other SMTP devices to alert system administrators of the UPS' activity or lack thereof.

Femrite agrees, but points out that, although it's desirable to have a UPS with a high efficiency rating, external bypass switches that enable power to bypass the UPS for maintenance purposes, monitoring capabilities (local and remote), warranties (system, batteries, etc.), and high-performance filtering, "they may not all be needed or cost-effective."

✔ Determine Whether It Makes Sense To Buy Used

There are plenty of used and/or refurbished UPSes on the market thanks in part to companies that have gone out of business or upgraded UPSes with useful life left in them.

But Darin Stahl, Info-Tech Research Group analyst, cautions that the economic downturn has caused enterprises to view their equipment differently. "The refresh cycle on the equipment has gotten longer, so what that means is there's less available used equipment because they're hanging on to this stuff and wringing every ounce of usefulness out of it," he says.

For example, Stahl says, some companies are holding on to their UPSes until the seven-year mark. If that's the case, he says, "Maybe I save some CAPEX, but I more than consume that in OPEX because of efficiency loss if I'm buying used gear."

As with any used equipment you purchase, make sure to check the UPSes carefully, including their history, and purchase from a reputable reseller. P

Buyers' Checklist

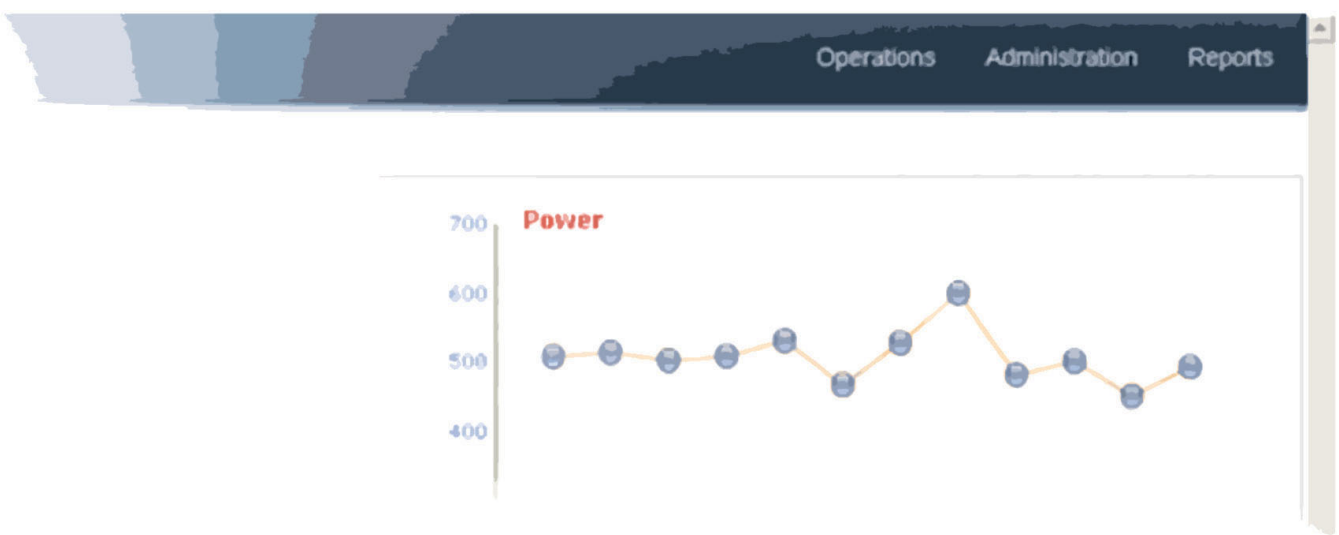
- ✔ Determine your power and protection requirements.
- ✔ Ensure the UPS can handle the required loads.
- ✔ Make certain the UPS provides sufficient runtime and capacity.
- ✔ Consider outsourcing battery installation, maintenance, and disposal duties.
- ✔ Determine warranty, insurance, and guarantee requirements.

Key Terms

line-interactive
A UPS with built-in line-sensing abilities to regulate high- and low-voltage levels; an inverter activates when power loss occurs and the system switches to battery power.

online
A UPS type providing the highest protection level; the inverter is online and operates constantly to eliminate incoming surges and low- and high-voltage issues while delivering clean power.

standby
A UPS type that runs power through surge suppression to connected equipment; after a power outage, the UPS switches to battery backup power, reverting to AC power when power returns.



Buying Tips:

DCIM Solutions

Data center managers are eyeing DCIM (data center infrastructure management) solutions for the numerous benefits they can offer by providing a holistic view of data center and facilities infrastructures. Here are some of the key elements to consider when purchasing a solution.

✔ Know What DCIM Can Do

DCIM solutions enable IT to view real-time power and temperature usage data on a granular level and provide monitoring, management, automation, optimization, and capacity and budget planning capabilities, all of which lead to the streamlining of operations and improving energy consumption and overall efficiency. Along with that real-time, holistic view into power, cooling, and other IT and physical assets, you'll get documentation, control, visibility, and metrics tools all in one solution.

DCIM solutions can replace spreadsheets, paper records, CAD drawings, and similar tools traditionally used to track assets. You'll gain real-time, in-depth views into physical and IT assets because, with DCIM, you'll have a firm understanding of where your infrastructure assets exist and where spare capacity exists.

Other benefits include quick completion of company-required changes; the ability to receive complete capacity data for power, rack units, cooling, chassis, and network capacity consolidated into one system; less downtime; and precise views of capacity, trend, and environmental data for everyone to access.

✔ Find The Right Product

When comparing DCIM solutions, there are several questions you should answer, says Nicholas Peterson, director of marketing at Critical Power Exchange (877/630-7520; www.criticalpower.com). Perhaps the most important question is, "Are your tools appropriate for the job?"

Be sure to consider what your greatest need is and your ability to fully use the platform's tools. For example, determine whether you have the resources in place to address issues the DCIM solution uncovers and change the facility or operating procedures to enable improvements.

The maturing of the DCIM market means there are products suitable for even small enterprises. When evaluating vendors, look for ones that have forged strong links with the leading enterprise IT management vendors. In some cases, your existing power vendors may offer solutions. This would be a good starting point as you already trust them as vendors.

Don't forget that, with whatever DCIM application you choose, you need to have the infrastructure support to run and maintain the application, says Alex North, director of business development at BayTech (800/523-2702; www.baytech.net).

✔ Seek An Easy Migration

Rather than re-creating the wheel, seek out a DCIM solution that supports easily migrating existing data to the new system, says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). For example, if you're maintaining multiple spreadsheets, CAD drawings, and other diagrams, he says, "migrating that information into the DCIM solution easily will be a lifesaver."

The solution should allow managers to start small and work up to added levels of sophistication in phases, he says. "Flexibility can breed complexity, and while a full-featured DCIM solution can seem complicated, getting started doesn't have to be." A modular solution that enables initially buying what's needed and layering in additional features gradually is a nice benefit. P

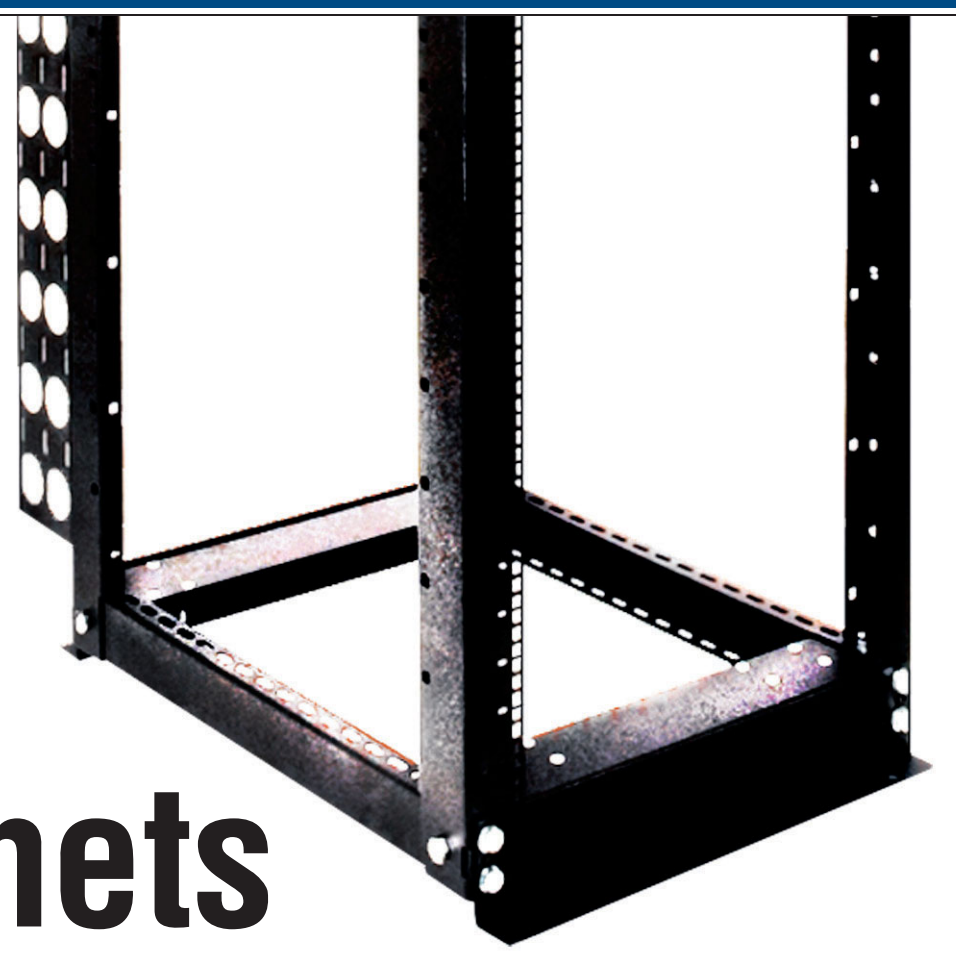
Buyers' Checklist

- ✔ **Plan for the future.** A DCIM solution should support capacity and optimization planning, offering tools that help "determine future requirements for power, cooling, floor space, rack space, and contingency planning," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).
- ✔ **Know what you're up against.** Possible obstacles to acquiring a DCIM solution can include the company's finance department vetoing the purchase; departments having different solutions in mind, leading to paralysis; vendors not providing a solution priced for the small to midsized enterprise; lack of manpower needed to learn, implement, and oversee the solution; and poor or slow solution support. Before investing in DCIM, know how you'll handle these obstacles.

Key Terms

Corporate Average Data center Efficiency (CADE) and Power to Performance Effectiveness (PPE)
Two rating systems, created by McKinsey and Gartner, that go beyond power usage effectiveness (PUE) and account for IT energy efficiency. Both systems are designed to help IT managers address low server utilization, which is the biggest source of waste in data centers today.

point solutions
Many DCIM vendors offer only one or two DCIM components, or points, rather than an entire suite of DCIM tools.



Buying Tips:

Data Center Racks & Cabinets

Racks and cabinets hold and protect every piece of equipment that runs your data center, so don't rush the decision about which cabinet to purchase. Instead, focus on the most important features and ensure the cabinet will fulfill your needs for years to come.

✔ Know What's On The Market

The first thing you should do when looking at racks and cabinets is research what's currently on the market. Companies offer full-sized 42U, midsized 26U, and 12U cabinets as well as racks with heights of 30 to 84 inches and widths of 24 to 36 inches.

Eli E. Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com), says you should look for potential add-on items, such as overhead storage compartments, power and cable management solutions, and back and side panels. Different sized racks and cabinets paired with additional solutions can help you design a product that's perfect for your data center.

✔ Pinpoint Your Needs

Consider the physical features you need for your specific environmental needs. "Establish what you need the cabinet to do," says Susan Wynne, senior sourcing specialist for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "If the equipment is noisy, you may want a sound reduction cabinet. If the environment is dirty, you may need a filtered cabinet. Even the area of the country is important, and you may need an air-conditioned or NEBS cabinet."

Other considerations include whether you have a sprinkler-based fire suppression system that requires NEMA 12 certified cabinets that keep out moisture, Wynne says. You should also consider built-in security measures, such as locked cages or other alternatives, if there is a lot of traffic in and out of your data center.

✔ Pay Attention To TCO

Don't treat racks and cabinets like a commodity, says Carrie Higbie, global director of data center solutions and services at Siemon (860/945-4200; www.siemon.com).

"Some companies get commodity-grade cabinets 'free' or at a reduced cost as part of other purchases, and while this may sound attractive up-front, sometimes you get exactly what you pay for." The commodity cabinet may be less expensive than a more full-featured cabinet, she says, but the TCO often changes when you have to spend time troubleshooting the commodity cabinet or making costly adjustments to support the cable plant.

✔ Research The Vendor

A cabinet or rack purchase is significant, and the decision of which vendor to buy from is just as important, Hertz says. Companies should be able to "grill the supplier on what they are actually going to be getting," and the vendor should be able to answer those questions by knowing "the product from nuts to bolts." Think of the vendor as a partner in the purchasing process and make sure it gives you enough information to make the best decision.

✔ Get The Right Fit

In most cases, you've decided which pieces of equipment to buy for your data center before you start shopping for the racks and cabinets to store them in. It's a great opportunity to measure each piece and come up with a mock configuration for how it will fit into the rack or cabinet. "This ensures the cabinet is tall enough, wide enough, and deep enough to handle the longest piece of equipment to be populated into the cabinet," Wynne says.

The amount of space the rack or cabinet takes up is equally important. "Make sure the outside dimensions of the cabinet will fit in the designated location," she says. And make sure you leave adequate space for expansion in the future. If you don't, you could get stuck with a cramped and inefficient data center with no room for evolution.

✔ Check For Airflow

Airflow is an important factor in cabinet selection, Higbie says. Many companies are getting away from smaller 24-inch cabinets in favor of wider cabinets with better pathways for cabling and more capabilities for airflow.

To ensure the cabinet you purchase has adequate airflow, you'll need to understand the power needed for each cabinet to help decide the amount of equipment that will go in that cabinet. From there, Higbie says, it's important to know where and how the PDUs mount and to keep power and communications cables out of the way of equipment exhausts and airflow. P

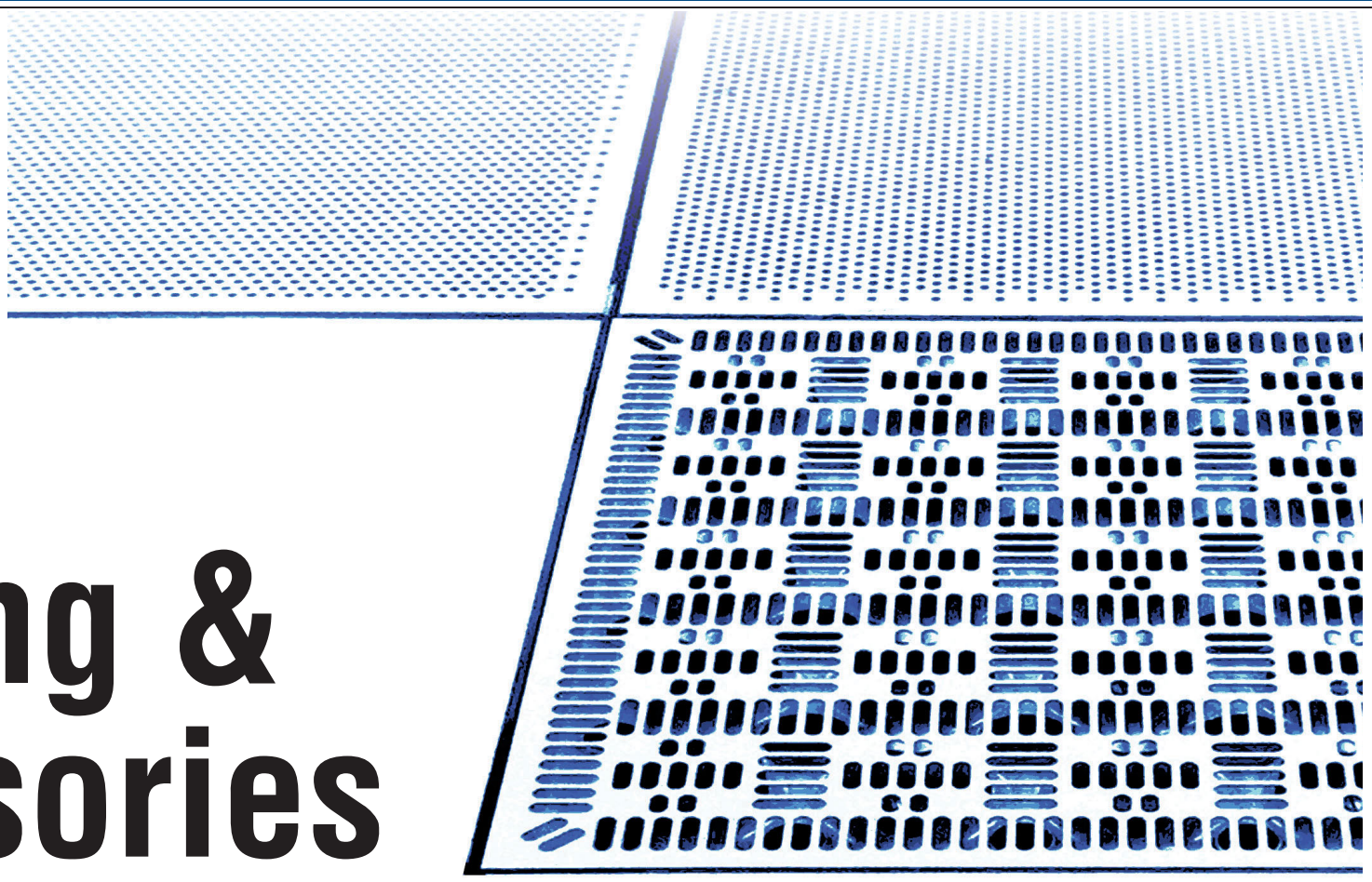
Buyers' Checklist

- ✔ Is cable management built-in, or does the rack or cabinet leave adequate space to neatly route cables?
- ✔ Does the rack/cabinet provide PDU mounting options such as brackets?
- ✔ Does the equipment you're mounting require tapped or M6 holes?
- ✔ Will you need to disassemble the rack/cabinet to get it in the room?
- ✔ Is the cabinet lockable to prevent potential security issues?

Key Terms

M6 holes
Square holes common with rackmount equipment and server cabinets; they can be adjusted to a round hole with a cage nut.

rackmount unit (RMU)
Cabinets and racks are measured in rackmount units, with each RMU, or U, equivalent to 1.75 inches.



Buying Tips:

Flooring & Accessories

Your data center's flooring can be just as important as the servers and other equipment it holds. Choosing the right flooring provides a stable, efficiently cooled data center. Here's what to look for.

✔ Know The Weight

Raised floor tiles come in different weight capacities, so consider your weight-bearing requirements when selecting tiles, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). The final floor has to be strong enough to support your equipment at the height of the raised floor. Also be aware of rolling load and use heavy-duty floor tiles where you will be moving equipment in and out of the data center.

Remember as rack sizes grow and densities increase, your floor tiles may need to support a greater weight than you have today. Plan ahead and install floor tiles to meet current and future needs, Koty says.

✔ Check The Finish & Material

Be careful when selecting the floor finish, Koty says. "You don't want be constantly replacing tiles in high-traffic areas to keep the floor looking uniform."

Avoid floor tiles wrapped in galvanized metal, Koty says, as the galvanized-wrapped tiles could cause zinc whiskers over time. And, if you are using cement-filled tiles, use a sealant to coat any cut edges of your tiles.

You'll also need to consider static dissipation and material weight, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Data center flooring needs to have a surface that is conducive of static dissipation," she says, to prevent the build-up of static electricity. In addition, she says, "lightweight solutions, as well as 'lay-down' panels rather than bolt-down ones, can make maintenance or swaps significantly easier."

✔ Be Aware Of Cooling & Floor Height

If you can maximize the available space underneath the floor, you can increase your data center's overall cooling efficiency. As for the height of the floor, there are some general standards to follow, Koty says:

- 12 inches for less than 1,000 square feet
- 12 to 18 inches for 1,000 to 5,000 square feet
- 24 to 36 inches for 5,000 or more square feet

Koty says if you want your new flooring to accommodate a hot/cold aisle configuration, make sure to plan your under-floor cable layout according to CRAC and PDU/RPP unit locations.

✔ Check Vendor Experience

If your company doesn't have anyone on staff with experience in data center flooring, don't hesitate to rely on the expertise of a vendor. It can help you choose the right flooring and prevent the need for a potentially costly flooring replacement down the road.

✔ Opt For Accessories

You may be tempted to cut corners to save money, but don't, Viars says. "Don't compromise on the integrity of your flooring. Make sure floor panels fit together as intended (even if it requires custom cutting/sizing), and spring for the additional airflow management accessories. It might cost a bit more upfront, but it will ensure that your cooling remains effective."

Koty says if you are planning a new raised floor construction job or a build-out, plan ahead and install brushed floor grommets as the floor tiles are being installed. "If you wait to install the grommets at the time the equipment is installed, you have fewer grommet options, plus there is the added risk of introducing contaminants into the data center." P

Buyers' Checklist

- ✔ Do the flooring panels fit your needs and allow for effective cable management?
- ✔ Is there enough open space underneath the floor for cable routing and cooling?
- ✔ Does your vendor have a stellar reputation and testimonials from past clients?
- ✔ Are all sections of the data center flooring capable of handling the weight and traffic to which they will be subjected?

Key Terms

bypass airflow
Conditioned air that does not reach computer equipment. Unintended bypass airflow can occur by escaping through cable cut-outs, holes under cabinets, misplaced perforated tiles, or holes in perimeter walls.

concentrated load rating (also referred to as static load)
Rating specified in pounds of force applied over a one square inch area.

directional airflow
Airflow panels such as perfs and grates that deliver air directly to the face of the rack.

panel
The material that makes up the walking surface of a raised floor. Depending on your weight and traffic needs, the panel may be made from steel, concrete with steel reinforcing bars, or aluminum.

rolling load
Dynamic (varying) loads that are usually created by moving equipment on casters over the raised floor.

PROCESSOR

Network With Your Peers

At These IT Training & Association Meetings Across The United States

MARCH

CompTIA Network Certification

March 11

New Horizons Lexington

1050 Chinoe Road, Suite 208

Lexington, Ky.

www.nhlexington.com

. . . . .

AITP Richmond

March 12

Hilton Garden Inn at Innsbrook

4050 Cox Road

Glen Allen, Va.

www.aitprich.org

. . . . .

AITP Wheeling

March 13

White Palace at Wheeling Park

1801 National Road

Wheeling, W.Va.

www.aitp-wheeling.org

. . . . .

AFCOM Potomac

March 14

Washington Dulles Airport Marriott

45020 Aviation Drive

Dulles, Va.

www.afcom.com

. . . . .

AITP Washington, D.C.

March 14

Alfio's La Trattorio Restaurant

4515 Willard Ave.

Chevy Chase, Md.

www.aitpdc.org

Administering Windows Server 2012

March 18

New Horizons Nashville

227 French Landing Drive, Suite 400

Nashville, Tenn.

www.nhnashville.com

. . . . .

Planning & Managing Windows 7 Desktop Deployment

March 18

New Horizons Tysons Corner

2010 Corporate Ridge

McLean, Va.

www.dcnewhorizons.com

. . . . .

AITP Southwest Missouri

March 19

High Street Baptist Church

900 North Eastgate Ave

Springfield, Mo.

aitpspringfield.org/main.html

. . . . .

AFCOM Greater Tampa Bay Chapter

March 20, 12:30 to 4 p.m.

www.tampabayafcom.com

. . . . .

AITP Northeastern Wisconsin

March 20

Holiday Inn Appleton

105 S. Nicolet Road

Appleton, Wis.

new.aitp.org/eventsmeeting-info

ISSA Los Angeles

March 20, 6:30 to 8 p.m.

Luminarias Restaurant

Monterey Park, Calif.

www.issala.org/event

. . . . .

AITP Cornhusker

March 21, 5:30 to 7 p.m.

Eatery Restaurant

2548 S. 48th St.

Lincoln, Neb.

www.aitpcornhusker.org

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Configuring & Managing Microsoft SharePoint 2010

March 25

New Horizons DC

1331 F St. NW, Suite 240

Washington, DC

www.dcnewhorizons.com

. . . . .

AITP Akron

March 26

Akron, Ohio

www.akron-aitp.org

. . . . .

ISSA Inland Empire

March 26, 6:30 to 8:30 p.m.

Upland, Calif.

ie.issa.org

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AITP California Southland

March 27

Garden Grove, Calif.

www.aitpcalsouthland.org

Upcoming IT Events

ISSA Baltimore

March 27

Concurrent Technologies Corp.

8530 Corridor Road

Savage, Md.

www.issa-balt.org

Mastering Microsoft Project 2010

March 27

New Horizons Tysons Corner

2010 Corporate Ridge

McLean, Va.

www.dcnewhorizons.com

ISSA Ottawa

March 28

Novotel Ottawa Hotel

33 Nicholas St.

Ottawa, Ontario

www.issa-ottawa.ca

APRIL

Big Data TechCon

April 8-10

Boston, Mass.

www.bigdatatechcon.com

AITP Wheeling

April 10

White Palace at Wheeling Park

1801 National Road

Wheeling, W.Va.

www.aitp-wheeling.org

AITP Washington, D.C.

April 11

Alfio's La Trattorio Restaurant

4515 Willard Ave.

Chevy Chase, Md.

www.aitpdc.org

AITP Richmond

April 16

Hilton Garden Inn at Innsbrook

4050 Cox Road

Glen Allen, Va.

www.aitprich.org

AITP Southwest Missouri

April 16

High Street Baptist Church

900 North Eastgate Ave

Springfield, Mo.

aitpspringfield.org/main.html

AITP Northeastern Wisconsin

April 17

Holiday Inn Appleton

105 S. Nicolet Road

Appleton, Wis.

new.aitp.org/eventsmeeting-info

Developing Microsoft SQL Server 2012 Databases

April 22

New Horizons Nashville

227 French Landing Drive, Suite 400

Nashville, Tenn.

www.nhnashville.com

AITP California Southland

April 24

Garden Grove, Calif.

www.aitpcalsouthland.org

ISSA Baltimore

April 24

Concurrent Technologies Corp.

8530 Corridor Road

Savage, Md.

www.issa-balt.org

Data Center World

April 28-May 2

Mandalay Bay Convention Center

Las Vegas, Nev.

www.datacenterworld.com

AITP Akron

April 30

Akron, Ohio

www.akron-aitp.org

ISSA Inland Empire

April 30, 11:30 a.m. to 1:30 p.m.

Upland, Calif.

ie.issa.org

MAY

ISSA Los Angeles 5th Annual Information Security Summit

May 21, 7:30 a.m. to 6 p.m.

Hilton Universal City

Universal City, Calif.

www.issala.org/summit

Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.

Buying Tips:

Get Rid Of Used Equipment

Getting rid of used equipment is one of those tasks that tends to get put on the back burner. It can be expensive and messy and take time away from other more important projects. These tips can simplify the process and help you find a recycling or disposal service partner you can trust.

✔ Establish A Plan

From an IT perspective, dealing with outdated equipment should be part of an overall disposition plan you do within a hardware asset-management program, says Darin Stahl, lead research analyst at Info-Tech Research Group. Knowing what to do with outdated equipment should "just be an outcome of your end-to-end hardware asset-management program, and just one of the disposition options. Plug it into the backend of that process and don't make it a one-time event," he says.

✔ Know Your Options

One of the most common methods for getting rid of used equipment is a fire sale, but many data centers will need to be aware of who they are selling to.

"A less time-consuming method is to sell to one of the many companies that exist by buying used servers and equipment and refurbishing them," says Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). "Bear in mind, often you will receive pennies on the dollar for this equipment, but normally the buyer will pay to pick it up and ship it to their facility and get it off your hands."

Another option is an asset recovery program, which is a service that performs both the IT asset buyback as well as the physical recycling of hardware. Some vendors will even create a fund for your organization so that the money you gain from selling used hardware can be used to purchase recertified equipment when you need new hardware.

✔ Complete A Thorough Audit To Find Equipment You No Longer Need

"You should identify and know what equipment you have on hand, what's operational, and what's been abandoned or is under- or unused," Femrite says. "You can't do much to get rid of unused equipment until you have completed a thorough audit and identified what can be removed." The inventory auditing process can be both tedious and time-consuming, as you'll want to check out all equipment, including fans, shelves, cables, and wires.

✔ Know What You Need From A Recycling Or Disposal Service

The equipment recycling or disposal service you choose depends on your goals, including security and environmental concerns and whether this is a one-time disposal or something that's ongoing.

For example, a company where data security is mission-critical will want to go with a service that keeps detailed records of wiping, reset, degaussing, and destruction of equipment. Many hardware resellers and disposal services will provide a complete report down to the final destination of the equipment, whether it be a certificate of destruction or information about recycling activity, such as if it was dismantled into parts for other products. Some hardware disposal companies are even audited to ensure compliance. If you want to continually recycle or resell surplus hardware, you may want to look for a service that will set up an ongoing contract with you.

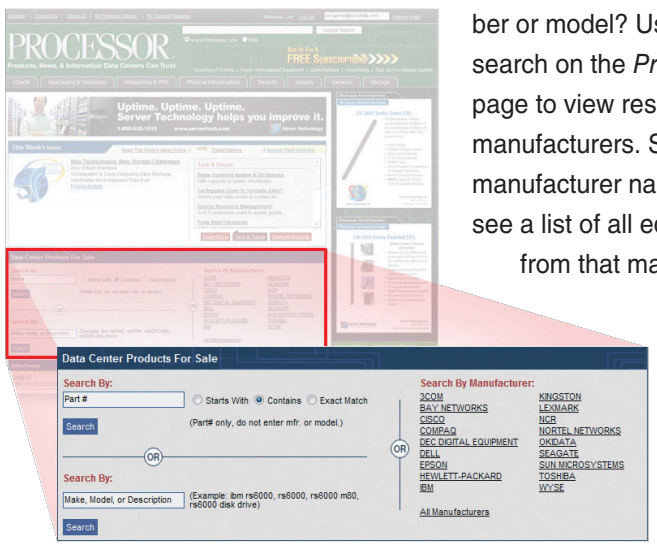
When seeking an asset disposal service, "Look to work with companies with a reputable asset recovery or refurbishing program," Femrite says. "They can often provide help in determining the value and final disposition of your unused IT assets and offer a variety of options to suit your needs."

For example, a disposal service company may be able to tell you if it'd make more economic sense to repair or reconfigure a given product, rather than destroy it or tear it apart for recycling. By maximizing the value of your equipment, an asset recovery service can also help to improve the green status of the company, because you are helping to make hardware sustainable for a longer period of time. P

Use Processor.com To Find Data Center Equipment

Looking for help pinpointing the products you need, from vendors you can trust? Finding the equipment you need is easy with *Processor*'s online Data Center Products For Sale database.

From *Processor*'s home page (www.processor.com), you can search for a specific part number, make, model, or description. Enter the information in the appropriate box and click Search. You'll see a list of available equipment. If you don't see the particular piece you're looking for, scroll to the bottom of the search results page to conduct a more detailed search. There, you can search by part number, model, price, location, and more.



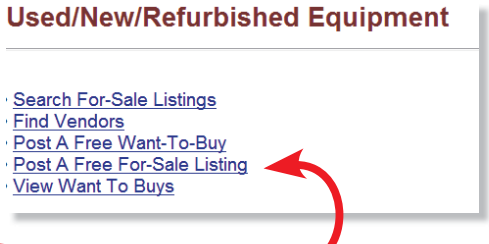
Don't know the specific part number or model? Use the drill-down search on the *Processor* home page to view results from specific manufacturers. Simply click the manufacturer name, and you'll see a list of all equipment listings from that manufacturer.

Do you have excess equipment?

Post it for sale on Processor.com!

On the Processor.com home page, click Used/Refurbished Equipment.

Choose Post A Free For-Sale Listing.



Follow the on-screen directions from there!

Processor Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

To list your company and products, call (800) 247-4880.

Physical Infrastructure

DATA AIRE INC.

Data Aire, Inc. has been designing and manufacturing precision cooling equipment for more than 40 years. We established some of today's industry standards, such as scroll compressors, steam generator humidifiers and microprocessor controllers. Our equipment can be found in any size organization or data center, from a closet to a Fortune 500 financial data center or government high security operation center. With our experience and expertise we can, and are willing, to design and build equipment to meet our customer's needs. With the shortest delivery times in the industry Data Aire can meet your requirements.

Products Available:

- Floor Mounted Units – CRAC or CRAH
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- Rack and Row Solutions
- Specialty Units
- Heat Exchangers
- System Controls

(800) 347-2473 | www.dataaire.com

Physical Infrastructure

SENSAPHONE® REMOTE MONITORING SOLUTIONS

Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Penn.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 I www.sensaphone.com

Physical Infrastructure

PDUs direct

PDUsDirect.com is a Master Distributor of select Server Technology PDUs for server and networked environments. PDUs Direct's basic, metered, and switched Rack PDUs provide local and remote power management, power monitoring, and environmental monitoring. We pride ourselves in offering industrial-grade quality products at the lowest prices, with the fastest shipping (most orders shipped within 24 hours) and simplest purchase process. We are the Power Behind the Business.

Products Sold:

A complete line of metered and basic PDUs, and 20A switched PDUs.

(888) 751-7387 I pdusdirect.com

Physical Infrastructure

temperature@lert

Temperature@lert is a leading provider of low-cost, high-performance temperature monitoring products designed to provide early warning of temperature changes before it's too late. The company's goal is to deliver products that can eliminate your worries about system malfunctions or product damage due to temperatures. The Boston, Mass.,-based company has sold more than 10,000 products to customers in 40 countries.

Products Sold:

A full line of temperature monitoring products, including the Temperature@lert USB Edition, WiFi Edition, and Cellular Edition

(866) 524-3540 I www.temperaturealert.com

Total Cable Solutions Universal PATCH™

Universal PATCH™ makes your job easier. With smart numbering, high density modules and an extreme modular design, the PATCH™ is the answer to your data center's most nagging questions.

- Modular design features interchangeable brackets to accomodate most major label (i.e. Corning) form factors.
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(888) 235-2097 | www.TotalCableSolutions.com

Physical Infrastructure

LINDY® CONNECTION PERFECTION

LINDY USA specializes in cables, adapters, electronics and accessories for computer, networking and audio video applications. Since 1932 Lindy has supplied high quality interconnects to customers in commercial, telecom and residential markets. What sets us apart is our complete dedication to innovation, performance and reliability. Our cabling products are truly outstanding.

Products Sold:

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(888)-865-4639 | www.lindy-usa.com/

Physical Infrastructure

Rack Solutions®

RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

Computer server racks, cabinets, shelves, and mounting products.

(888) 903-7225 I www.racksolutions.com

Physical Infrastructure

AVTECH

AVTECH Software, founded in 1988, is focused on making the monitoring and management of systems, servers, networks, and data center environments easier. AVTECH provides powerful, easy-to-use software and hardware that saves organizations time and money while improving operational efficiency and preparedness. AVTECH products use advanced alerting technologies to communicate critical status information and can perform automatic corrective actions.

Products Sold:

A full range of products that monitor the IT and facilities environment, including temperature, humidity, power, flood, room entry, and UPS

(888) 220-6700 I www.AVTECH.com

Physical Infrastructure

PDU Cables™ Innovator in data center efficiency

PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 I www.pducables.com

Physical Infrastructure

Atlas Sales & Rentals, Inc. THE PORTABLE COOLING & HEATING SPECIALISTS

Atlas has specialized in portable air conditioning since 1979 and leads the industry in server room and data center portable cooling. We offer "24/7" response from company-owned, full-service offices around the country, each stocked with a wide inventory of equipment for primary, supplemental, or emergency cooling. All portable items are available for sale or rental. Atlas is a Preferred MovinCool® Distributor and a GSA Certified MAS Contractor.

Products Sold:

- 1-5 ton portable air conditioners, air and water-cooled
- 12-ton portable coolers designed to roll through a standard doorway
- Ceiling-mount air conditioners – full line of MovinCool® packaged a/c units

(800) 972-6600 I www.AtlasSales.com

Physical Infrastructure

RACKMOUNT SOLUTIONS

Rackmount Solutions' mission is to listen to the IT engineer's specific needs and deliver superb-quality, high-performance products through continuous product innovation and operational excellence. We pride ourselves in providing quality customer service, products that fit your IT requirements, and solid value for your money.

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- Wallmount and server racks and cabinets, including sound proof, air conditioned, and large cable bundle
- Desktop/tabletop portable racks
- Shockmount shipping cases
- Bulk cable

(866) 207-6631 I www.rackmountsolutions.net

Physical Infrastructure

MESTEX
A Division of Mestek Inc.
4830 Transport Drive | Dallas TX 75247

The Mestex division of Mestek is comprised of seven company brand names: Applied Air, LJ Wing, Aztec, Alton, Temprite, Koldwave, and Sierra. Mestex is involved in emerging technology and product research focused on using energy and water more efficiently, including ways to improve data center efficiency by using outside air, evaporative cooling, and optimized DDC control schemes.

Products Sold:

- Mechanical and evaporative cooling products
- Heating products
- Outside air tempering products
- Packaged evaporative cooling solutions for mission-critical applications

(214) 819-5262 I www.mestex.com

Physical Infrastructure

Server Technology
Quality Rack Power Solutions

Server Technology is committed to the PDU market with the largest group of engineers dedicated to power distribution and other solutions within the equipment cabinet. Advancements in device power monitoring help data centers monitor and improve their efficiency, and continuous research and development is fueled by companies that look to Server Technology for their custom cabinet power solutions.

Products Sold:

A complete line of cabinet PDUs, including Per Outlet Power Sensing (POPS), Rack Mount Fail-Safe Transfer Switch, Console Port access with remote power management, Switched, Smart, Metered, Basic, and -48 VDC

(800) 835-1515 I www.servertech.com

Physical Infrastructure

hergo®
TECHNICAL WORKSPACE SOLUTIONS

Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

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- Racks
- Enclosures/cabinets
- Motorized workstations
- Flat-panel arms
- Computer desks
- Cable management
- Power management

(888) 222-7270 | www.hergo.com

Physical Infrastructure

SIMPLEX™
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Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.,-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Enclosures
- Strip doors
- Curtains

(877) 746-7540 I www.simplexisolationsystems.com

Physical Infrastructure

BayTech®

BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 I www.baytech.net

Physical Infrastructure

SIEMON™

Headquartered in Connecticut, Siemon has been around since 1903 as a provider of high-quality cabling solutions designed to improve network connections, performance, and efficiency. The company manufactures end-to-end copper and fiber cabling systems, cabinets, racks and cable management solutions for data centers, and more. Siemon also has an R&D arm, Siemon Labs, which focuses heavily on innovation and shows the company's long-term commitment to its customers.

Products Sold:

- Cable management solutions
- Data center cabinets and racks
- End-to-end copper and fiber cabling
- High-speed interconnects
- Intelligent infrastructure management

(860) 945-4200 | www.siemon.com

Physical Infrastructure

AUSTIN® HUGHES

Founded in 1995, Austin Hughes Electronics Ltd is a design and manufacturing group that offers a broad range of solutions based around 19 inch rack mount technology. With a wealth of experience Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handels
- InfraPower Cabinet Intelligent PDUs
- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 I www.Austin-Hughes.com

Networking & VPN

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Metric Systems Corporation® designs and manufactures broadband wireless networking equipment, and end-to-end solutions for government and industry. We've been in the business of manufacturing and integrating reliable industrial-grade wireless networking systems for over 25 years. Our networks are deployed around the world protecting and supporting people and machines. Our specialty is working with your unique requirements and existing infrastructure to provide a networking solution that fits your requirements, schedule, and budget.

Products Sold:

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Products Sold:

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- Servers (barebones, custom, rackmount, and storage)
- Software
- Storage (DAS, iSCSI SAN, JBOD, NAS, SAN)

(800) 500-9526 I www.aberdeeninc.com

Storage

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Products Sold:

- A range of enterprise data protection products, with capacity from 10TB up to 2PB.

(866) 737-2866 I www.sepaton.com

Servers

CHENBRO

Chenbro is a leader in enclosure solutions, selling its products primarily to system integrators and OEM and channel partners. The company's extensive research and development efforts help it to keep its competitive edge and maintain market leadership, with special focus on thermal, EMI, and acoustic solutions. Taiwan-based Chenbro has offices in the United States, UK, The Netherlands, and China.

Products Sold:

- A comprehensive line of PC chassis, server/workstation chassis, rackmount chassis, and HDD enclosures.

(909) 947-3200 I www.chenbro.com

Servers

SUPERMICRO®

Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology, is a premier provider of advanced server Building Block Solutions® for enterprise IT, data center, cloud computing, HPC, and embedded systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative by providing customers with the most energy-efficient, environmentally-friendly solutions available on the market.

Products Sold:

- Servers
- Motherboards
- Chassis
- Network switches
- Storage solutions
- Blade servers
- GPU servers
- Embedded

(408) 503-8000 I www.supermicro.com

Clients

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www.dtsearch.com

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Products Licensed:

Text retrieval products, including:

- Desktop with Spider
- Network with Spider
- Publish (for portable media)
- Web with Spider
- Engine for Win & .NET
- Engine for Linux

(800) IT-FINDS | www.dtsearch.com

Equipment Dealer

PCM

In 1987, Pegasus Computer Marketing started providing mainframe products to the end-user market. What began as a sales-only organization soon adapted to offer in-house repair and refurbishment. During the past 10 years, Pegasus has focused primarily on the point-of-sale and barcode industries, buying, selling, and providing service contracts for anywhere from a few scanners to hundreds.

Products Sold:

We buy, sell, and service:

- Point-Of-Sale Equipment and POS/PC Flat Panels
- Wired and Wireless Barcode Hardware
- Kronos Time Clocks and Accessories

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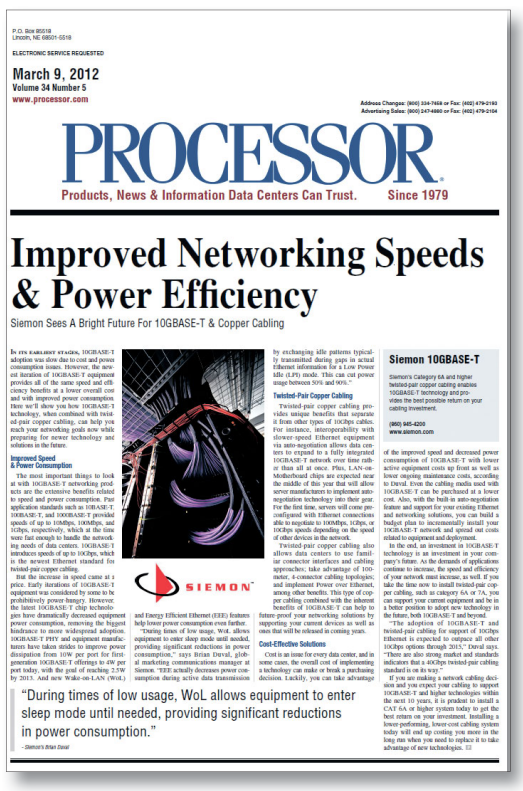
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